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A mis padres, hermanos, hijos y esposa

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Essays on Tax Morale

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ABSTRACT: This thesis uses experiments and theory to explore "Tax Morale" which is the broad concept that groups taxpayer's non-pecuniary nor legally enforced reasons to give money to governments. I assume that giving is motivated by consequentialist norms, as well as conditional on (a) others' behavior and (b) the person's beliefs about how competent the public sector is, together with her/his support to the current government. The evidence from a lab experiment in Peru is in line with these hypotheses. Further, less people give zero if they are informed about (i) two specific government projects (a subway line and a children's hospital) or (ii) that some well-known Olympic medalist pays punctually her taxes, according to public information released by the Peruvian tax Agency. The findings are arguably relevant to understand taxpayers' non-selfish reasons to pay (or evade) their taxes and contribute to the recent literature on tax morale.

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RESUMEN: Esta tesis se sustenta en un modelo teórico y experimentos para explorar lo que se conoce como "Moral Fiscal", es decir el amplio conjunto de razones no monetarias ni legales por las que las personas contribuyen voluntariamente con su pago de impuestos. Este trabajo sostiene que la contribución voluntaria es motivada por normas consecuencialistas, asimismo que resulta condicional a (a) el comportamiento de otros (b) las creencias acerca de qué tan competente es el sector público y/o su apoyo al actual gobierno. La evidencia obtenida de un experimento de laboratorio en el Perú está en consonancia con estas hipótesis. Además, menos personas dan cero si son informadas acerca de (i) dos proyectos específicos del gobierno (la línea 2 del metro de Lima y el nuevo Hospital del Niño) o (ii) que una muy conocida medallista olímpica paga puntualmente sus impuestos, según información pública difundida por la Agencia Tributaria de Perú. Los resultados son relevantes para entender las razones no egoístas de los contribuyentes para pagar (o evadir) impuestos, y contribuyen a la literatura más reciente sobre moral fiscal.

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Introduction

People often contribute money to their governments, in its most prominent form, by paying taxes. Since enforcement cannot reach all taxpayers in any country, the question of why people voluntarily pay their taxes is a crucial one for economic research and public policy because taxes support most of public investment and expenditures around the world (Andreoni, Erard & Feinstein, 1998). Indeed, tax evasion has been an important research topic for many years, starting from the seminal paper by Allingham and Sandmo (1972), who adapted the Becker (1968) model of crime deterrence to study tax evasion. Their model assumes that taxpayers are standard economic agents focused on their own material interest and hence stresses dissuasion as the main reason behind tax compliance. In other words, people pay taxes if the expected punishment for evasion is large enough, that is, if the probability of detection and the ensuing material sanction are sufficiently high.

While the model by Allingham and Sandmo (1972) is remarkable for its parsimony, its empirical validity has been often contested (Alm, McClelland & Schulze, 1992; Andreoni et al., 1998; Frey, 2003; Luttmer & Singhal, 2014). In effect, since prevailing sanctions and detection probabilities around the world are arguably low, the model seems to be inconsistent with the relatively low levels of tax evasion observed in most developed economies (Alm et al, 1992; Torgler, 2002). In short, dissuasion cannot explain by itself the actual levels of voluntary tax compliance. This fact has caused the birth of an abundant literature that analyzes the importance of psychological and cultural elements to explain taxpayers' behavior (Scholz & Witte, 1989; Alm & Jackson, 1993; Pommerehne & Weck-Hannemann, 1994; Feld and Frey, 2002; Torgler, 2002; Luttmer and Singhal, 2014; Mascagni, 2018; Alm, 2019).

These not-related-to-the-dissuasion arguments have been grouped under the ample concept of "Tax Morale", which includes varied non-standard motivations like loss aversion, peer effects, reciprocity, and social norms, to name a few, but also cognitive aspects like biased perceptions, bounded rationality, and the application of mental heuristics. One of the appeals of a better understanding of these elements is that they might suggest ways to reduce tax evasion at a relatively low cost for the tax administration, which often has limited resources to pursue a very strict control strategy (for examples, see Del Carpio, 2014; Hallsworth, List, Metclafe & Vlaev, 2017).

Focusing on the motivational side, what drives citizens to comply with their tax obligations or more generally to contribute to their governments? This thesis offers some

insights on this point by means of a utility model of tax morale and data from a lab-in-the-field experiment. The model extends the approach in López-Pérez (2008) and makes two key hypotheses.[1] First, there is a social norm that commends to act so as to maximize social welfare. If people deviate from this consequentialist norm, second, they suffer a utility cost that depends directly on (a) the magnitude of the deviation, i.e., the expected 'harm' or decrease in social welfare that the deviation causes and indirectly on (b) the average deviation among the reference group members (peer effects). These hypotheses are in line with ideas emphasized by previous studies. To start, (Slemrod, 2002; Fellner, Sausgruber & Traxler , 2013; Luttmer & Singhal, 2014; Alm, Bloomquist & Mckee, 2016) provide or review evidence on the importance of peer effects and social influences on tax compliance.[2] These effects have also been observed in experimental lab studies on deception, of which false filing of tax forms is an instance; see (Gino, Ayal & Ariely, 2009; Fosgaard, Hansen & Piovesan, 2013; Innes & Mitra, 2013; López-Pérez & Spiegelman, 2013). In turn, the role of moral rules and long-run cultural effects reflecting internalized social norms has been also stressed by (Andreoni et al. 1998; Luttmer & Singhal, 2014; DeBacker et al. 2015; Dulleck et al. 2016).

In a nutshell, the model says that people contribute to their governments (e.g., paying some taxes) *partly* because they find that behavior correct or morally right, particularly if others do their part as well and the donation improves social welfare, which requires a relatively well-functioning government. A controlled test of this story seems difficult to implement in the field, e.g., observing actual tax compliance. In the field, on one hand, compliance might be affected by other factors like deterrence, social pressure, or the existence of a tax law stating how much one should contribute, possibly strongly expressing societal values –e.g., Sunstein, 1996.[3] On the other hand, I claim that some specific beliefs affect contributions and compliance, and they can be hardly measured in the field in a non-obtrusive manner. For all these reasons, I decided to explore contributions in the lab, using a decision problem in which donations are anonymous, there are no sanctions, and formal laws have no say regarding how much one should donate.[4]

[1] López-Pérez (2008); López-Pérez (2010) discuss in length the psychological underpinnings of the model. In addition, López-Pérez (2008) shows that the model can explain a large number of robust experimental facts, including some at odds with other models of non-selfish preferences like Rabin (1993) and Fehr and Schmidt (1999).

[2] Similar to my assumption (b), Myles and Naylor (1996); Traxler (2010) develop models where a taxpayer's utility depends on the share of tax evaders, so as to explain a number of phenomena that the standard model cannot account for. These models do not explicitly incorporate the other assumptions mentioned above.

[3] In my account, people can give to their governments even if there is no law stating so. Note yet that this does not exclude the possibility that laws, acting as a salient signal of social norms, reinforce norm awareness, peer effects and hence giving.

[4] Some readers may object that, because there is no formal obligation to give in my experiment, I can say little about tax compliance. I beg to differ: these findings show that people have motives to contribute voluntarily to the public good, conditional on some factors, and I can find no reason why such motives should be inoperative or

The experiment was run in Peru and is very simple: Each subject is endowed with 30 Soles (around $10) and can voluntarily and anonymously donate some of this endowment to the Peruvian government. Somehow surprising to me, a very substantial share of the subjects gives something (around ¾ of them). Moreover, giving is correlated with a number of variables, as predicted by the model. First, I elicit each subject's beliefs about the average donation by other subjects and find it significantly correlated with her/his donation (peer effects). The reader might object that this could be due to a false consensus effect, so that subjects believe that others tend to donate as much as them –Ross, Greene, and House (1977). Evidence from a treatment in which *reference* beliefs are arguably fixed, however, suggests that beliefs causally affect donations. Second, I predict that giving will be correlated with the subject's perceptions about how efficient and competent the government is. Intuitively, people would feel no remorse for not giving if they thought that most taxes are stolen or squandered. I ask subjects at least two questions that approximate those perceptions: (a) the ranking of Peru in the International Transparency index of corruption,[5] and (b) the level of support of the current president. A regression analysis shows that donations to the government are significantly correlated with the responses to the second question. To my knowledge, I am the first to report controlled experimental evidence on this point. On the other hand, I do not find a correlation between donations and other variables like gender, political ideology, religiosity, age, income level, and education. Although correlation does not imply causation, the consistency of the model with the data seems remarkable, particularly given that other models of non-selfish preferences have problems to explain some of my findings (as I explain later). In an additional treatment where the donation recipient is a well-reputed NGO, finally, the average subject donates a similar amount as in the control treatment, and donations co-move as well with the subjects' beliefs about the average donation by others.

In addition, I explore the potential effects of two policies that aim to increase giving to the government. In the Informed Policies (IP) treatment, the instructions mention two recent public projects in the city of Lima: The subway line 2 and the new Children's Hospital. In line with the model, I conjecture that people are more willing to give if they are happy with the way

'deactivated' when there is compulsion –e.g., when people decide on paying their taxes. In this vein, neurological evidence suggests that both taxation and voluntary donations activate similar neural substrates: Harbaugh, Mayr and Burghart, (2007) show that both voluntary donations and mandatory tax-like transfers to a charity elicit activity in the same brain region associated with processing rewards.

[5] Peru is a country with relatively high levels of perceived corruption. Indeed, in the International Transparency report of 2017, Peru has the 96th position out of 180 analyzed countries, worsening its position of the previous three years and below the regional average. On a different topic, I note that the public sector in Peru is relatively small, as government spending amounted to around 16.5% of total output (GDP) over the years 2014 to 2017 (source: Central Bank of Peru).

in which the government uses the money. Yet people can be sometimes unaware or not very well informed about government spending (I provide indeed evidence in this line). By giving information about two specific public projects, therefore, I expect a significant increase in median giving relative to the Control treatment, as it happens to be the case. In the Public Figure (PF) treatment, in turn, subjects receive instead information about a famous Peruvian Olympic medalist, noting that her firm pays its taxes punctually. In this respect, the model predicts that giving is conditional, that is, people give more if they expect others to give as well. More to the point, further, I conjecture that this conditionality depends on the identity of the agent's referents. In particular, the example set by well-know and reputed public figures should have a relatively larger effect on giving than the example set by an average, random person.

While due caution is warranted in extrapolating the evidence to the realm of tax compliance, the data hence *suggests* that consequentialist norms affect tax evasion. As the subjects in the study, taxpayers might be willing to contribute (some) money to the government –e.g., voluntarily paying (part of) their taxes–, particularly if they have *relatively* positive perceptions about its performance and believe that other taxpayers comply as well. It must be stressed that participants in this study were a representative sample of the population of taxpayers in Lima, and not just university students. Furthermore, the external validity of these results seems supported as well by previous survey evidence from Latin America –Torgler (2005) uses data sets from Latinobarómetro and the World Values Survey to analyze the determinants of tax morale in this region, and Ortega, Ronconi and Sanguinetti (2016) study citizens' attitudes to tax obligations by means of surveys implemented in 17 cities of Latin America.[6] On the other hand, these results are in line with the remarks by many researchers on tax compliance –e.g., Andreoni et al. (1998) reckon that citizens' perceptions about government spending and level of corruption are relevant elements in understanding compliance.

This thesis is organized as follows. The first chapter reviews the standard neo-classical literature on tax evasion, starting on the Allingham and Sandmo model and its predictions, then I present some evidence on them along the years and across some countries; after that, I analyze the new literature under the ample concept of 'Tax Morale', linking any item I consider

[6] Several Latinobarómetro reports also find that the payment of taxes has a high statistical relationship with the citizens' perception that governments work for the well-being of all. It must be noted that such perceptions tend to be negative in most Latin American countries, particularly in Argentina, Dominican Republic and Peru. In this respect, while we find that Peruvian taxpayers differ in their willingness to give money to the government, our model also hints that, in a cross-country comparison, aggregate evasion will be relatively high in countries where the average or modal perception is negative, like Peru. Similarly, the model implies that the differences in the rates of tax evasion normally observed between developed and other economies are partly due to differences in these perceptions and peer effects.

important for the decision to contribute to government with the main ideas I will turn to hypotheses later.

In the second chapter I introduce a utility model with norms that will be tested later in chapters three and four. In this, I describe a norm, it means a formal mathematical definition of what (I claim) most agents consider important in their decision-making process, I also define a Social Welfare Function that will be useful to describe how utility is affected when a representative agent deviates from a specific binding and consequentialist norm, and finally, I set specific examples of norms and utility functions applied to the decision of contributing to governments in the form of tax payments. In the third chapter I present the results of my experimental evidence collected in the years 2016 and 2017 and test several predictions that follow from the model, specifically the importance of the agents' beliefs about government's competence and other people's donations as explanatory variables for the decision to donate. In the fourth chapter I test two alternative policy rules designed for the 2018 sessions and whose objective is improving voluntary compliance. The first policy informs the subjects about two projects of public infrastructure actually developed by the central government in Lima, and the second one informs the subjects that a well-known and well-reputed public figure pays punctually its taxes. I also present the aggregate results, the theoretical predictions, and tests them with a regression analysis. The last section concludes with a discussion of the main contributions of this work.

Introducción

Las personas usualmente contribuyen monetariamente con sus gobiernos a través de su forma más común, el pago de impuestos. Puesto que la disuasión y el control no pueden alcanzar a todos los contribuyentes (cualquiera sea el país), la pregunta de por qué la gente paga voluntariamente sus impuestos es crucial para la investigación económica y el diseño de políticas públicas ya que los impuestos financian la mayoría del gasto y las inversiones públicas alrededor del mundo (Andreoni et al., 1998). De hecho, la evasión de impuestos ha sido un tema de investigación importante durante muchos años, sobre todo a partir del trabajo seminal de Allingham y Sandmo (1972), que adaptaron el modelo de la economía del crimen de Becker (1968) para el estudio de evasión fiscal. Su modelo supone que los contribuyentes son agentes económicos estándar centrados en su propio interés material y por lo tanto subraya a la disuasión como la razón principal detrás del cumplimiento tributario. En otras palabras, la gente paga impuestos si el castigo esperado por evadir es lo suficientemente grande, es decir, si la probabilidad de detección y la consiguiente sanción material son suficientemente altas.

Si bien el modelo de Allingham y Sandmo (1972) resulta notable por su claridad y simpleza, su validez empírica ha sido a menudo cuestionada (Alm et al., 1992; Andreoni et al., 1998; Frey, 2003; Luttmer y Singhal, 2014). En efecto, puesto que las sanciones vigentes y las probabilidades de detección alrededor del mundo son indiscutiblemente bajas, el modelo parece ser inconsistente con los niveles relativamente bajos de evasión observados en las economías más desarrolladas (Alm et al. 1992; Torgler, 2002). En resumen, la disuasión no puede explicar por sí misma los niveles reales de cumplimiento tributario voluntario. Este hecho ha provocado el nacimiento de una abundante literatura que analiza la importancia de elementos psicológicos y culturales para explicar el comportamiento de los contribuyentes (Scholz y Witte, 1989; Alm et al., 1993; Pommerehne et al., 1994; Feld y Frey, 2002; Torgler, 2002; Luttmer y Singhal, 2014, Mascagni, 2018, Alm, 2019)

Estos argumentos no-relacionados con la disuasión han sido agrupados bajo el amplio concepto de "Moral Fiscal", la que incluye variadas motivaciones no estándar como la aversión a las pérdidas, efectos de pares, reciprocidad y normas sociales, por nombrar a algunas, pero también aspectos cognitivos como prejuicios, racionalidad limitada y la aplicación de heurísticas mentales. Uno de los atractivos de una mejor comprensión de estos elementos es que puede sugerir formas de reducir la evasión a un costo relativamente bajo para la administración tributaria, la que a menudo tiene limitados recursos para desarrollar una

estrategia de control muy estricta (para ejemplos, véase Del Carpio, 2014 y Hallsworth et al., 2017).

Si nos concentramos en la parte motivacional podríamos preguntar: ¿Qué impulsa a los ciudadanos a cumplir con sus obligaciones fiscales, o más generalmente a contribuir con sus gobiernos? Esta tesis ofrece algunas hipótesis por medio de un modelo de utilidad que incluye la moral fiscal, y datos de un experimento de laboratorio semejante a un experimento de campo. El modelo extiende el de López Pérez (2008) y hace dos hipótesis principales. En primer lugar, existe una norma social que recomienda actuar con el fin de maximizar el bienestar social. Segundo, si las personas se desvían de esta norma consecuencialista sufren un costo en su utilidad que depende directamente de la magnitud de la desviación, es decir, del 'daño' esperado o de la disminución en el bienestar social que causa la desviación e indirectamente de (b) la desviación promedio entre los miembros del grupo de referencia (efecto de pares). Estas hipótesis están en línea con ideas de estudios anteriores. Por ejemplo, Slemrod (2002), Fellner et al., (2013), Luttmer y Singhal (2014) y Alm et al (2016), proporcionan evidencia sobre la importancia de los efectos de pares y las influencias de tipo social en el cumplimiento tributario. Estos efectos también se han observado en estudios de laboratorio experimental acerca del engaño, del que la evasión de impuestos es un componente; Ver por ejemplo Gino et al (2009), Fosgaard et al., (2013), Innes y Mitra (2013) y López-Pérez y Spiegelman (2013). A su vez, el papel de las reglas morales y efectos culturales de largo plazo que reflejan las normas sociales internalizadas ha sido destacado también por Andreoni et al (1998), Luttmer y Singhal (2014), DeBacker et al., (2015) y Dulleck et al (2016).

En resumen, el modelo dice que las personas contribuyen con sus gobiernos (por ejemplo, pagando impuestos) en parte porque encuentran ese comportamiento correcto o moralmente justo, particularmente si otros también lo hacen y si perciben que su contribución mejora el bienestar social, lo que requiere un gobierno que funciona con al menos relativa eficiencia. Parece muy difícil realizar en el campo una prueba controlada acerca de esta proposición, por ejemplo, observando el cumplimiento tributario real. Precisamente, en el campo, el cumplimiento podría verse afectado por otros factores como la disuasión, la presión social o la existencia de una ley tributaria indicando cuánto debe uno contribuir. Por lo tanto, puedo asegurar que algunas creencias específicas sí afectan el cumplimiento, y estas no pueden ser medidas en el campo de una manera no intrusiva. Por estas razones decidí explorar el cumplimiento en el laboratorio, usando un problema de decisión en el que las contribuciones son anónimas, no existen sanciones, ni tampoco leyes formales que digan cuánto se debe contribuir.

El experimento se realizó en Perú y es muy sencillo: cada sujeto recibe una dotación inicial de 30 Soles (alrededor de $10) y puede voluntariamente y de forma anónima entregar una parte de esta dotación al gobierno peruano. Sorprendentemente, un porcentaje muy importante de los sujetos contribuye positivamente (alrededor de 3/4 de ellos). Más aún, la contribución se correlaciona con una serie de variables tal como predice el modelo. Primero, se recogen las creencias de cada sujeto sobre la contribución promedio de los otros sujetos y se encuentra que estas se correlacionan significativamente con su propia contribución (efecto de pares). El lector podría objetar que esto podría deberse a un "falso consenso", de tal manera que los sujetos creen que otros tienden a dar tanto como ellos – Ross, Greene y House (1977). Sin embargo, la evidencia de un tratamiento en que las creencias de referencia se encuentran fijas nos sugiere que estas si afectan causalmente a las contribuciones. En segundo lugar, el modelo predice que las contribuciones se correlacionarán con las percepciones del sujeto sobre cuán eficiente y competente es el gobierno. Intuitivamente, la gente no sentiría ningún remordimiento por no dar si piensa que los impuestos se apropian ilícitamente por funcionarios deshonestos o que serán desperdiciados. A los sujetos se les formula dos preguntas que aproximan estas percepciones: (a) la clasificación de Perú en el índice de corrupción de Transparencia Internacional y (b) el nivel de apoyo al actual presidente. Análisis de regresión muestran que las contribuciones al gobierno se correlacionan significativamente con las respuestas a la segunda pregunta. Según mi conocimiento, este es el primer trabajo en informar evidencia experimental controlada sobre este punto. Por otro lado, no se encuentra correlación entre las contribuciones y otras variables como género, ideología política, religiosidad, edad, nivel de ingresos y educación. Cabe señalar que, aunque la correlación no implica causalidad, la consistencia del modelo con los datos parece notable, especialmente teniendo en cuenta que otros modelos de preferencias no egoístas tienen problemas para explicar algunas de mis conclusiones (tal como explico más adelante). Adicionalmente, en un tratamiento en el que el destinatario de la contribución es una ONG de buena reputación, el sujeto promedio da una cantidad similar a la del grupo de control, y las contribuciones también se mueven conjuntamente a las creencias de los sujetos acerca de la contribución media de los otros sujetos.

Por último, esta tesis explora los efectos potenciales de dos reglas de política que pretenden aumentar las contribuciones voluntarias al gobierno. En el tratamiento de políticas de información (IP), las instrucciones mencionan dos recientes proyectos públicos en la ciudad de Lima: la línea 2 del metro y el nuevo Hospital del Niño. En consonancia con el modelo, conjeturo que las personas están más dispuestas a contribuir si se encuentran satisfechas con la manera en que el gobierno utiliza el dinero. De hecho, la gente puede ignorar o no estar muy

bien informada sobre el gasto del gobierno (proporciono evidencia en esta línea). Por lo tanto, dando información acerca de dos proyectos públicos específicos, se espera un aumento significativo en la mediana de la contribución en relación con el grupo de Control, lo que se comprueba finalmente. De manera similar, en un tratamiento llamado de figura pública (PF), los sujetos reciben información sobre una famosa medallista olímpica peruana, señalando que su empresa paga puntualmente sus impuestos. En este sentido, el modelo predice que la contribución es condicional, es decir la gente da más si espera que otros den también. Además, el modelo predice que esta condicionalidad depende del referente del sujeto. En particular, reputadas figuras públicas deberían tener un efecto relativamente más grande en la contribución que una persona promedio, al azar.

Aunque debemos ser cautos en la extrapolación de la evidencia para el sistema tributario en general, los datos sugieren que las normas consecuencialistas afectan el cumplimiento. Es decir, los contribuyentes podrían estar dispuestos a contribuir, por ejemplo, pagando voluntariamente (parte de) sus impuestos, particularmente si perciben como relativamente positivo el desempeño del gobierno y si creen que los otros contribuyentes también cumplen. Debe destacarse que en este estudio participó una muestra representativa de la población de contribuyentes en Lima y no estudiantes universitarios. Además, la validez externa de estos resultados parece apoyada por evidencia anterior sobre América Latina recogida por encuestas, por ejemplo, Torgler (2005) quien utiliza conjuntos de datos de Latinobarómetro y la Encuesta Mundial de Valores para analizar los determinantes de la moral fiscal en esta región, y Ortega y otros (2016) quienes estudian las actitudes de los ciudadanos hacia las obligaciones tributarias por medio de encuestas en 17 ciudades de Latinoamérica. Por otra parte, estos resultados están también en consonancia con las observaciones de muchos investigadores sobre cumplimiento tributario, por ejemplo, Andreoni y otros (1998) quienes consideran que las percepciones de los ciudadanos sobre el gasto del gobierno y el nivel de corrupción son elementos relevantes en la comprensión del fenómeno del cumplimiento.

Esta tesis está organizada de la siguiente manera. El primer capítulo repasa la literatura neoclásica estándar en evasión de impuestos a partir del modelo de Allingham y Sandmo y sus predicciones. A continuación, presento evidencia recogida a lo largo de los años y en varios países. Después, analizo la literatura bajo el nuevo y amplio concepto de 'Moral Fiscal', teniendo en cuenta cualquier elemento que considero importante para la decisión de contribuir al gobierno en relación con las hipótesis que se presentan más adelante.

En el segundo capítulo introduzco un modelo de utilidad con normas sociales que se someterá a comprobación más adelante en los capítulos tres y cuatro. En este sentido, describo

una norma, es decir una definición matemática formal de lo que la mayoría de los agentes considera importante en su proceso de toma de decisiones, también defino una función de Bienestar Social que será útil para describir cómo se afecta la utilidad cuando un agente representativo se desvía de una norma específica, y también, lo que se entiende por "Norma Consecuencialista", finalmente, proporciono ejemplos específicos de las normas y funciones de utilidad aplicadas a la decisión de contribuir a los gobiernos en la forma de pago de impuestos. En el tercer capítulo presento los resultados de mis pruebas experimentales recogidas en los años 2016 y 2017 y pruebo varias predicciones que se derivan del modelo, específicamente la importancia de las creencias de los agentes sobre la competencia del gobierno y de las contribuciones de otras personas como variables explicativas de la decisión de contribuir. En el cuarto capítulo pruebo dos reglas de política alternativas diseñadas para las sesiones de 2018, y cuyo objetivo es mejorar el cumplimiento voluntario. La primera regla de política informa a los sujetos acerca de dos proyectos de infraestructura pública desarrollados por el gobierno central en Lima y la segunda informa a los sujetos que una figura pública muy conocida y de buena reputación paga puntualmente sus impuestos. También presento los resultados agregados, las predicciones teóricas y pruebas con análisis de regresiones. La última sección concluye con una discusión de las principales aportaciones de este trabajo.

Chapter 1 Tax compliance and tax morale

The modern economic literature on tax compliance starts with the paper by Allingham and Sandmo (1972, A-S henceforth) who adapted the Becker (1968) model of crime deterrence to study tax evasion. For some years after, much of the literature explored in detail the A-S model and provided some interesting extensions, although fundamentally keeping its neo-classical spirit[7]. In the first section of this chapter, I explore several basic predictions of the A-S model. Afterwards, I discuss the (sometimes limited) empirical relevance of this model, and I argue how the introduction of tax morale elements might significantly improve its relevance.

1.1 The Allingham-Sandmo Model: Basics

In the A-S model, W is the taxpayer's exogenous income, known by the taxpayer but not by the government, θ is the tax rate on declared income X (the taxpayer's decision variable), and hence $\theta \cdot$X the amount of tax to pay. If the taxpayer chooses to fully declare then W = X. However, she may choose to report X < W evading an amount equal to W-X. The tax authority does not know the true income and sets an enforcement system described by a probability p to audit the taxpayer ($0 \leq p \leq 1$) and a penalty or fine μ[8] for each dollar evaded, which is supposedly higher than θ. If the tax authority catches an evader, it fully detects the true income, hence imposing a fine of $\mu \cdot$(W-X) dollars in addition to the evaded tax. The taxpayer chooses X so as to maximize

$$E[U] = (1-p)U(W-\theta X) + pU\big(W-\theta X-\mu(W-X)\big) \quad (1)$$

If we introduce:

$$Y = W-\theta X$$

$$Z = W-\theta X-\mu(W-X) \quad (2)$$

The first order condition for an interior maximum of $E[U]$ is:

$$-\theta(1-p)U'(Y) - (\theta-\mu)pU'(Z) = 0 \quad (3)$$

In turn, the second order derivative of (1) is called D, and equals:

[7] A Von Neumann-Morgenstern utility function (linear, concave or quasi-concave) with consumption as the main argument (other variations include leisure but the results are very similar) and dissuasive policies (like audits and fines) as factors affecting (mostly reducing) utility.

[8] The penalty rate μ (the punishment for evading) is usually a percentage of the undeclared income (W-X) and tax agencies usually collect the fine $\mu \cdot$(W-X) separately to the evaded tax θ.(W-X), but each one also includes interests from the due time of the obligation to the final payment date.

$$D = \theta^2(1-p)U''(Y) + (\theta - \mu)^2 pU''(Z) \quad (4)$$

Note well that the sign of D is negative if U is concave, as it is assumed afterwards. To check for an interior solution, the marginal expected utility at X = 0 and X = W is evaluated. Given how Y and Z are defined, an interior solution requires that

$$\frac{\partial E[U]}{\partial X}_{X=0} = -\theta(1-p)U'(W) - (\theta - \mu)pU'\big(W(1-\mu)\big) > 0$$

and

$$\frac{\partial E[U]}{\partial X}_{X=W} = -\theta(1-p)U'\big(W(1-\theta)\big) - (\theta - \mu)pU'\big(W(1-\theta)\big) < 0$$

And these two conditions can be respectively rewritten as

$$p\mu > \theta\left[p + (1-p)\frac{U'(W)}{U'\big(W(1-\theta)\big)}\right] \quad (5)$$

$$p\mu < \theta \quad (6)$$

Both (5) and (6) guarantee an interior solution. Condition (6) leads to the first, straightforward

Prediction 1: Ceteris paribus, a rational agent will choose to evade at least some part of her income (W-X > 0) if the expected fine per unit of undeclared income ($p\mu$) is less than the tax rate θ.

A-S also explore the comparative statics of their model in terms of its main parameters. For this, they use the Arrow-Pratt Absolute (A) and Relative (R) risk aversion measures:

$$R_A(Y) = -\frac{U''(Y)}{U'(Y)};\ R_R(Y) = -\frac{U''(Y)\cdot Y}{U'(Y)} \quad (7)$$

Then, they differentiate the first order condition (3) with respect to income W and obtain:

$$\frac{\partial X}{\partial W} = \frac{1}{D}[\theta(1-p)U''(Y) + (\theta - \mu)(1-\mu)pU''(Z)] \quad (8)$$

Then, they substitute the first order condition (3) into (8) to get the following expression

$$\frac{\partial X}{\partial W} = -\frac{1}{D}\theta(1-p)\,U'(Y)\left[-\frac{U''(Y)}{U'(Y)} + (1-\mu)\frac{U''(Z)}{U'(Z)}\right] \quad (9)$$

And simplifying with the definition of the absolute risk aversion measure in (7),

$$\frac{\partial X}{\partial W} = -\frac{1}{D}\theta(1-p)U'(Y)[R_A(Y) - (1-\mu)R_A(Z)] \quad (10)$$

If absolute risk aversion is decreasing, it follows that $R_A(Y) < R_A(Z)$. Hence, the sign of expression (10) is positive only if the penalty rate is greater than one ($\mu > 1$). Since this is a

rather restrictive condition, A-S consider as well the sign of the derivative of the *fraction of real income* reported when income changes, to obtain

$$\frac{\partial(X/W)}{\partial W} = \frac{1}{W^2}\left(\frac{\partial X}{\partial W}W - X\right) \tag{11}$$

Then they substitute (8) and (4) into (11) to obtain

$$\begin{aligned}\frac{\partial(X/W)}{\partial W} = \frac{1}{W^2}\frac{1}{D}[&\theta(1-p)U''(Y)W + (\theta-\mu)(1-\mu)pU''(Z)W \\ &- \theta^2(1-p)U''(Y)X - (\theta-\mu)^2pU''(Z)X]\end{aligned} \tag{12}$$

A-S simplify this expression using the definitions of Z and Y in (2) and get:

$$\frac{\partial(X/W)}{\partial W} = \frac{1}{W^2}\frac{1}{D}[\theta(1-p)U''(Y)Y + (\theta-\mu)pU''(Z)Z] \tag{13}$$

Finally, they substitute the first-order condition (3) to have

$$\frac{\partial\left(\frac{X}{W}\right)}{\partial W} = -\frac{1}{W^2}\frac{1}{D}\theta(1-p)U'(Y)[R_R(Y) - R_R(Z)] \tag{14}$$

With this last expression it turns clear that when actual income varies, the fraction declared increases, stays constant or decreases depending respectively on whether relative risk aversion is an increasing, constant or decreasing function of income. This carries us to

Prediction 2: If the agent's utility function exhibits a decreasing relative risk aversion to income, she will report a smaller fraction of her income (W) as it grows, thus increasing the amount evaded W-X.

In order to explore the effect on reported income X of the other parameters of the model, A-S differentiates F.O.C. (3) with respect to the tax rate θ, and use the definitions of risk aversion in (7) to obtain:

$$\frac{\partial X}{\partial \theta} = \frac{1}{D}X\theta(1-p)U'(Y)[R_A(Y) - R_A(Z)] + \frac{1}{D}[(1-p)U'(Y) + pU'(Z)] \tag{15}$$

A-S point out that the first term on the right side of (15) is an income effect that is positive: In effect, an increased tax rate θ makes the taxpayer less wealthy (Y and Z decrease for any level of X), and if relative risk aversion is decreasing, it would reduce evasion (W-X). The second term is a substitution effect which is negative because an increase in the tax rate θ makes it more profitable to evade taxes on the margin. The following prediction summarizes the prior discussion.

Prediction 3: The effect of an increase in the tax rate θ on evasion is ambiguous and ultimately depends on the predominance of the income or the substitution effect it produces.

In a similar fashion, differentiating as well the F.O.C. (3) with respect to the penalty rate μ, I obtain:

$$\frac{\partial X}{\partial \mu} = -\frac{1}{D}(W - X)(\theta - \mu)pU''(Z) - \frac{1}{D}pU'(Z) \quad (16)$$

And point out that both terms in the expression are positive which implies

Prediction 4: An increase in the penalty rate μ will always increase the fraction of actual income declared X, thus reducing evasion.

Finally, A-S explore whether more inspections (audits) increase compliance or not by deriving first order condition (3) with respect to p:

$$\frac{\partial X}{\partial p} = \frac{1}{D}[-\theta U'(Y) + (\theta - \mu)U'(Z) \quad (17)$$

Since this derivative is positive, the following result is direct

Prediction 5: An increase in the probability of detection p will always lead to a larger income being declared, reducing evasion.

In summary, unambiguous results can be derived for the two parameters of the model which are of particular interest for policy purposes, i.e., the penalty rate μ and the probability of detection p.

1.2 Evidence

In the early 1980s, an abundant data set was prepared and released to the public by the United States Tax Authority (the Internal Revenue Service 'IRS'). This information was obtained from the 1969 Taxpayer Compliance Measurement Program (TCMP) and included estimates of the voluntary compliance rate by audit class[9] and aggregate data on numerous taxpayer characteristics. In this program, taxpayers were randomly selected for thorough audits and this real information, together with similar data coming from other countries, allowed researchers to test economic theories of noncompliance in the following years.

Please notice that most empirical works testing the A-S model refer to the personal income tax as it is the main focus of the model. In what follows, I discuss each of the predictions above mentioned in the light of this evidence.

Prediction 1: Tax evasion is expected if the expected tax payment on undeclared income or expected penalty ($p\mu$) is smaller than the tax rate θ.

For some *preliminary* **discussion** on this point, Table 1 depicts average values for some parameters of the A-S model in some OECD and Latin American countries. Note that this table

[9] Audit classes (seven in the study) were determined by a combination of the amount and source of income.

refers, as well as the A-S model, to personal income tax and all calculations were made with the information available at the tax agencies of each country.[10]

Country	**1** Number of taxpayers registered (income tax)	**2** Number of audits made on income tax	**3** Probability of being audited (p) (2/1)	**4** Penalty (μ) % of undeclared income	**5** Expected penalty (p. μ) (3*4) %	**6** Tax rate (θ) %	**7** Income tax evasion (% of potential)
EEUU	142'000,000	933,785	0.0066	5%	0.03%	18.40%	10.1%
France	37'900,000	343,000	0.0091	10%	0.09%	14.80%	12%
Japan	42'000,000	200,000	0.0048	100%	0.48%	7.90%	8%
Canada	27'090,400	585,361	0.0216	50%	1.08%	26%	3.5%
Sweden	5'600,000	43,174	0.0077	20%	0.15%	56.78%	0.39%
Mexico	38'500,000	60,000	0.0016	45%	0.07%	21.36%	11.5%
Colombia	2'902,256	300,000	0.1034	20%	2.07%	20%	34.4%
Peru	6'900,000	43,000	0.0062	50%	0.31%	17.8%	15.7%

Note: Personal income data (2018) obtained from the tax services of each country, IRS (EEUU), IMPOTS (France), NTA (Japan), CRA (Canada), SKATTEVERKET (Sweden), SAT (Mexico), DIAN (Colombia) and SUNAT (Peru). The methodology to calculate income tax evasion is obtained from Lahura (2016) made in two steps. First, the potential collection of labor income is generated using the number of people of working age and the expansion factor of each socioeconomic level that pays taxes. Second, Potential Collection (PC) and Effective collection (EC) are substracted (TN = PC-EC) and the result is Tax Noncompliance (TN). Finally, Tax Evasion (TE) is TN as a percentage of Potential Collection, this is shown in column 7.

Columns 4 to 7 are in percentages. Column 3 is column 2 divided by column 1. Column 4 is a penalty that applies as a percentage of undeclared income as it is used in most countries and appears in tax agencies web sites (see also footnote 8 in 1.1). Column 5 is column 3 multiplied by column 4 (to replicate A-S prediction 1). Column 6 is the average tax rate on income as appears in tax agencies' web sites.

Table 1: Estimated parameters of the A-S Model

As we can observe, the A-S model would predict full (or positive) evasion for all countries in the table but the actual estimated rates of evasion in column 7 contradict that. Moreover, some of the data seems also problematic for the A-S model. For instance, Colombia shows approximately the same tax rate than Peru, but Peru has a tax evasion rate far lower than that of Colombia even though Colombia has an expected penalty far higher than that of Peru. More substantially, the estimated rates of tax evasion look too low, particularly taking into

[10] A particular remark concerns the data in column 3 about the probability of being audited (p). Since p is an unconditional estimation, it is very likely to be an under-estimation of the actual one for many taxpayers, but also an over-estimation for those others subject to third party reports (by their employers), which are in many countries out of the scope of regular audits. In Peru, for instance, the tax agency audits only taxpayers who are partially subjected to third party reports or those who have other sources of income besides this one.

account that the estimated expected penalty is also rather low in all countries. This suggests that penalty rates are not so essential to deter evasion as predicted by the A-S model.[11]

A more precise discussion of this point requires considering the taxpayers' degree of risk aversion, however. In one of the best attempts to test the A-S model's predictions, Alm et. al. (1992) assume a standard concave utility function and derive predictions about the compliance rate. Using data from the United States, they find that a mid-range estimate of the coefficient of relative risk aversion ($R_R(Y) = 3$) implies a rate of compliance of only 13 percent, well below any audit-based estimates of compliance for most forms of business income. In fact, their calibration suggests that the coefficient of relative risk aversion has to be quite high ($R_R(Y) = 5$) to achieve 44 percent compliance and extraordinarily high ($R_R(Y) = 10$) to achieve 71 percent compliance. In this line, Alm (2019) discusses some field evidence on the coefficient of relative risk aversion pointing out that there are a variety of estimation approaches, but most of them range between 1 and 2 and may even be as low as 0 (Friend & Blume, 1975; Hansen & Singleton, 1983; Hall, 1988; Chetty, 2006; Gandelman & Hernandez-Murillo, 2013). It follows that risk aversion in the A-S model must be abnormally large to explain actual observed choices, even in countries with lower levels of compliance.

Prediction 2: There is a positive relation between income and the evasion rate, provided that the agent's utility function exhibits decreasing relative risk aversion.

Discussion: Clotfelters (1983) uses the TCMP data cited above to analyze the empirical relationships among income, the marginal tax rate and evasion. He estimates a Tobit model in which the endogenous variable is evasion and the exogenous variables are the after-tax-income and the combined state and federal marginal tax rate (among other socioeconomic and demographic variables). In line with prediction 2, the author reports a positive and significant coefficient for the first variable (for both of them, in fact). Moreover, the elasticity of evasion with respect to income varies from 0.3 to above 3 as income increases.

However, a test of this prediction using field data presents a number of issues. One of them is that in the A-S model income is exogenous and therefore it is theoretically possible to obtain an effect of its variation in the amount reported, but in the real world tax authorities regularly use combined policy mechanisms to fight evasion which makes income endogenous and the analysis of pure income effects impossible to observe. In this line, Andreoni et. al.

[11] Indeed, Sandmo (2005) points out that penalty rates are lower than tax rates in most places all around the world (Table 1 above) and nevertheless we do not see full evasion. He even offers an example in which the penalty rate μ, ceteris paribus, is twice the regular tax rate θ and finds that only a probability of detection p greater than 0.5 would be able to deter full evasion but that p is far higher than that obtained by most empirical estimates all around the world (see also table 1 above).

(1998) remind some interesting attempts of making income endogenous by adding labor supply (see Pencavel, 1979; Cowell, 1981; Sandmo 1981). However, the effects of the enforcement tools simultaneously used turned to be all ambiguous. The authors suggest a possible explanation in which an increase in enforcement may reduce the effective wage rate that in turn may decrease labor supply and then income but if the labor supply curve is backward bending, more enforcement may increase the labor supply and decrease the amount reported (increasing evasion). In this same line, however, other studies found that individuals work more to increase earnings to cover probable audit's losses causing in turn to also increase evasion (see Weiss, 1976). Moreover, they also find that other utility functions gave also ambiguous results when manipulating parameters and thus think that evasion appears to be better explained instead by the strategic interaction between the tax authority and taxpayers and not by the shape of the taxpayer's utility function. Finally, they conclude that all the attempts to extend the A-S model under the rational-agent umbrella cannot explain why many people choose to comply when they may evade without legal punishment (the tax compliance puzzle) and therefore, the moral consequences of being untruthful or the social consequences of being known as a cheater would play a fundamental role to explain tax compliance.

Prediction 3: The effects of an increase in the tax rate θ on evasion are ambiguous depending ultimately on the income and substitution effects.

Discussion: Sandmo (2005) tries to solve the ambiguity between the income and substitution effects by including black labor market and leisure but his model cannot predict how the tax rate affects reported income. In contrast, Yitzhaki (1974) notes that this ambiguity is a consequence of the assumption that the taxpayer should pay a penalty rate μ on the undeclared income $(W - X)$. Instead, he proposes a penalty or fine (F) to be imposed on the evaded tax $\theta(W - x)$ and not income, as it is usual under the American or Israeli tax laws. This action rules out any ambiguity because in this specific case there is no substitution effect. Assuming decreasing relative risk aversion, he indeed proves that evasion decreases as the tax rate increases –see expression (15) above for some intuition in this regard.

Contrary to this, however, some empirical studies find that marginal tax rates do not have a significant effect on tax evasion. For example, Kleven, Knudsen, Kreiner, Pedersen and Saez (2011) run a tax enforcement field experiment in Denmark for a representative sample of over 40,000 individual income tax filers. In the base year, half of the taxpayers were randomly selected to be thoroughly audited, while the rest not and used as control. In the following year, threat-of-audit letters were randomly assigned and sent to tax filers in both groups. The authors define that pre-audit measurement includes the combined effect of tax avoidance and tax

evasion, post-audit involves the tax avoidance only, and the difference between them refers to the effect of tax evasion only. They then find that the pre-audit (both factors) elasticity is 0.16, the post-audit (tax avoidance) is 0.085 and the difference between the two (tax evasion) is 0.076 (which they identify as the substitution effect), all measures are statistically significant. Therefore, they conclude that the marginal tax rate has only a small positive substitution effect on tax evasion for taxpayers with mostly self-reported income, and third-party reporting turns to be much more important than low marginal tax rates to improve compliance.

Also, Porcano (1988) reports no effect of the tax rate on evasion and underreporting in his sample. Moreover, Park and Hyun (2003), whose work I will detail in the next prediction, find that an increase in 1% in the tax rate even decreases in 0.3954% the compliance rate. In contrast, Pommerehne and Weck-Hannemann (1996) present data from Switzerland, an interesting country for testing the A-S model because, according to the authors, its strong fiscal decentralization adds considerable variance in the potential determinants of tax evasion. They estimate a simultaneous equation system and find a significant positive impact of the marginal tax rate on evasion, in line with similar empirical findings by (Clotfelter, 1983; Witte & Woodbury, 1985; Alexander & Feinstein, 1987).

Prediction 4: There is a negative relationship between evasion and the penalty rate μ (a higher penalty rate produces a decrease in evasion)

Discussion: According to this prediction, if most taxpayers were risk-averse the tax authority would easily fight against evasion by raising μ sufficiently. On the same vein, the paper by Sandmo (2005) just cited shows that the effects of changes in the penalty rate μ and the probability of detection p have the same signs as they have in the A–S model, in line with Prediction 4.

In an empirical work of this point, Park and Hyun (2003) use an asymmetric-information variation of the A-S model in which income is exogenously endowed and therefore, is known only by the individual taxpayer. They set a lab experiment with graduate students as subjects and the experiment consisted of nine sessions with 15 rounds each, all of them with different combinations of tax rates, audit rates, fine rates, absence/presence of public goods, and education on the importance of voluntary and honest tax payments. Then they exogenously assign different levels of income for different rounds in the same session, keeping the other parameters constant. All parameters are known by the subjects and each subject is, therefore, asked to report her income 135 times during the experiment. They also set three different levels of income tax rate at 10, 25, and 40% and three different levels of penalty rates 100, 300, and 500%. The audit probability also takes three different values of 6, 10, and 15%., and the subjects

of audits were chosen according to a Bernoulli random variable with the corresponding success probability. Finally, the distribution of income was assumed to have independent and normal distribution. They set a compliance rate (actual income/reported income) as a dependent variable, run a Tobit model and find that raising 1% the penalty rate produces an increase in 1.0467%, in the compliance rate but raising 1% the probability of audit increases compliance in only 0.4212%. They say that all estimates have the expected signs and also are statistically significant. They conclude that their most important finding is that the penalty rate has the bigger effect on compliance.

However, Andreoni et. al. (1998) remind that the penalty rate has never been so high in any country (see column 4 in Table 1 above), mostly because a very high penalty would produce bankruptcy making this prediction impossible to prove empirically in the field. It appears that the actual effect of the penalty rate on compliance is very difficult to prove in the field. Indeed, this rate is not as high in any country (mostly) for political reasons, and those works that have tested its effects have been made only theoretically or in laboratory and not having real taxpayers as subjects.

Prediction 5: An increase in the probability of detection p will reduce evasion.

Discussion: Witte and Woodbury (1985) conducted one of the first regression modeling studies on the topic published in the literature. They used the TCMP data cited above, made a random audit assumption, and found that higher probabilities of audits were associated with higher levels of compliance. This result however presents a number of issues. To start, the effects were lagged probably due to the consistency between changes in objective and perceived audit probabilities, even more, Dubin and Wilde (1988) suggest that Witte and Woodbury's model was wrongly specified since many of the tax agency variables are indeed endogenous including the audits that are not random but determined instead by taxpayer characteristics and IRS resources. Using the same TCMP data as Witte and Woodbury, they reported inconsistent results with respect to the deterrent effects of audits. Also, Beron, Tauchen and Witte (1988) use data from different sources in the mid 1970's and estimate a three-equation model for taxpayers' reported income, tax liability and the probability of an audit. Even though they find that audits stimulate compliance, the effect was not large nor statistically significant.

In turn, Luttmer and Singhal (2014) remind that most tax authorities intentionally avoid disclosing information on their auditing and enforcement procedures making taxpayers to have incomplete information about true audit rates or penalties. For example, Scholz and Pinney (1995) use matched IRS-survey data from the United States and find that individuals report a subjective probability of being detected (conditional on underreporting income) far higher than

the actual IRS' probability of audit. Moreover, they find that variations in actual audit probabilities by the tax authority do not influence this taxpayers' process. In contrast, Del Carpio (2014) finds that Peruvian taxpayers apparently underestimate the probability of audit and disclosing its actual numbers would improve tax collection. She claims that a combination of a payment reminder and information about enforcement of property tax both increases perceived probability of audit and this results in increased tax compliance. However, the effects appear to be caused mainly by the payment reminder[12]. In this point, Luttmer and Singhal (2014) think that this finding instead suggests a failure of individual optimization due to bounded rationality rather than wrong perceptions about the probability of audit. They say that this is consistent with Hallsworth, List, Metcalfe, and Vlaev (2014), who also find a direct effect of payment reminders on UK taxpayers for similar reasons.

Sandmo (2005) also points out that p is indeed the taxpayer's subjective probability, which is not necessarily equal to the statistical frequency with which peoples' tax returns are checked. He even mentions some empirical studies in which people tend to overestimate the probability of detection (See Andreoni et. al. 1998), then he claims that this overestimation would increase p above observable audits/taxpayers ratios to high enough levels to make the A-S model's predictions sound. He also mentions some studies based on surveys showing that people greatly overestimate the probability of being audited, e.g. (Scholz & Pinney, 1993).

Even though, if we assume that the probability of audit p is indeed the perceived one, its real impact on tax compliance appears to be rather weak according to more recent experimental evidence. For example, Blumenthal, Christian and Slemrod, (2001) run a field experiment in 1995 in which they randomly selected a 'treatment group' of 1724 Minnesota taxpayers, then they formed six sub-groups according to two variables, the first was the 'income' with three categories (low, middle and high); the second variable was the 'opportunity to evade' with two categories (high-opportunity: taxpayers who declared being small business or farm proprietors and thus were more difficult to be controlled by the tax authority; and the 'rest of taxpayers' for whom there exists more accurate information of their income). Then the experimenters send the treatment group's subjects a letter saying that the returns they were about to fill would be 'closely examined'. The authors used two years of data to make comparisons of changes in reported income, deductions, and tax liability between the treatment and the control group (those who did not receive this letter).

[12] Indeed, it is worth noting that municipalities do not audit, but just collect the property tax (which is of a far simpler calculation than the income tax). Hence the message could act more as a payment reminder than as an audit warning.

After the experiment was done, both treatment and control increased their reported liabilities and the difference in differences[13] was 2.5% higher for treatment. However, the main difference was found in the 'low-income and high-opportunity' sub-group with 14.2% higher for treatment but only a slight 2% for the 'low-income and low-opportunity' segment. For the 'middle-income and high-opportunity' sub-group the difference in differences was 4% higher in treatment and 3.2% in the 'middle-income and low-opportunity' sub-group but the difference was negative for the high-income segment (4.7% for the high-opportunity segment and 10.9% for the low-opportunity one). In general, even though there was an increase in the tax payments compared to the previous year (making possible the existence of previous noncompliance), the difference in differences was not statistically significant for the treatment group. As a result, the authors conclude that a threat of examination (increasing the perceived probability of audit) appears to increase the reported income and tax liability only of low- and middle-income taxpayers, especially those that have greater opportunities to evade taxes but the increased tax collections from this group are only less than 2% of total tax liability.

Additional evidence comes from Park and Hyun (2003), described above. In effect, when subjects know the parameters (e.g. the probability of audit/detection) the authors find a positive, significant, however modest effect of the probability of audit on compliance (elasticity is only 0.4212%, being that of the penalty rate far higher). On the same topic, Tan and Yim (2014) run a computerized experiment to test the introduction of a new auditing rule that creates strategic uncertainty among taxpayers. They consider two treatments: the first in which they introduce uncertainty by informing subjects of the maximum number of audits to be carried out (bounded rule), and the second in which, resembling what the A-S model implies, they inform the subjects about the exact audit probability (Flat rule). The authors claim that the bounded rule describes the actual auditing practice more realistically and also implies a game theoretic environment since the probability of being audited depends on the other taxpayers' evasion decisions. Their results show that compliance levels are statistically the same between control and the flat rule treatment but improve significantly for the bounded rule one (even though the number of audits remains constant). The authors think that this happens because of the attraction of the safe strategy and uncertainty aversion. In this regard, Heinemann, Nagel, and Ockenfels (2009) provide evidence that people prefer a sure, safe outcome to a better but riskier one with a realized probability depending on the decisions of others. All these findings imply that even

[13] The difference in the percentages' variation of both groups

with limited auditing resources, tax authorities would enhance the deterrence effect by revealing audit policies carefully to taxpayers.

Kleven et al (2011), whose study for 40,000 taxpayers in Denmark was mentioned above for prediction 3, find a positive effect of the threat-of-audit letters on the amounts and probabilities of self-reported adjustments to income and tax liability. For total net income, letters cause a change of 19% in the initial adjustments (in absolute value). Also, the probability of self-reported adjustment increases by 1.63 percentage points from a base of 13.37% (an increase of 12.2%), being these estimates strongly significant. Nevertheless, the quantitative magnitudes of the letter effects are modest compared to the effects of actual previous-year audits, which suggests that audit-threat letters create less variation in the perceived probability of detection than actual audit experiences. Thus, the authors conclude that analyzing concrete audits may be a more powerful way to understand the deterrence effect of enforcement than sending out letters.

Many first generation laboratory experiments varying audit probabilities found expected but low positive effects of audit rates on compliance (Spicer & Thomas, 1982; Mason & Calvin, 1978; Song & Yarbrough, 1978; Spicer & Lundstedt, 1976; Warneryd & Walerud, 1982). However, Fischer, Wartick and Mark (1992) claim that these experiments seem biased because instructions appeared to direct subjects to maximize income and ignore nonpecuniary factors that may encourage compliance in the real world, while those run afterwards and designed to better mask the purpose of the study found no consistent results (see e.g., Robben, Webley, Elffers & Hessing, 1990; Weigel, 1991). The authors point out that survey studies may be also biased towards a positive correlation between *p* and compliance because it is highly possible that individuals who evade tax are less likely to participate in the studies and on the contrary, compliance behavior of those who do participate surely causes a greater perceived probability of detection (the authors claim that those who are compliers tend to think that enforcement is higher, rather than the reverse).

On the other hand, some may think that the regression studies are more valid to analyze evasion because they are based on actual taxpayer compliance data. Nevertheless, these authors say that of the four regression studies they reviewed, two of them, contrary to what it is expected, provide evidence of a negative correlation between audit probability and compliance (Dubin, Graetz & Wilde, 1987; Dubin & Wilde, 1988), a third failed to detect a statistically significant relationship between these variables for half of the cases examined (Beron, Tauchen & Witte, 1992) and only the pioneer work of Witte and Woodbury (1985) appears to demonstrate a positive relationship between *p* and compliance (however, criticized by later

works like those mentioned). It appears then that there is no firm evidence that increasing detection probability affects compliance, and additional studies with the same research designs are not likely to provide the necessary evidence either (see also Roth et al. 1989, p. 105).

More recently, Ariel (2012) reports a field experiment with 4,395 firms in Israel in which two groups received different tax letters, one letter conveying a deterrent message that can be interpreted as an increase of the probability of audit and the other a moral persuasion one. His results indicate that both treatments do not produce statistically significant greater compliance compared with control conditions. Even more, the persuasion letter produced a backfiring effect in terms of deductions. Gangl, Torgler, and Kirchler (2014) conduct another field experiment for newly started firms in Austria. They analyze the effect of a "friendly" supervision on timely tax payments, which may be interpreted as an audit. The authors eliminate previous experiences between taxpayers and the tax administration by focusing only on new firms, and mostly on those classified as high-risk groups for tax evasion. Their results indicate that close supervision offers no overall positive effect on tax compliance but alternatives to enforcement measurements such as service and/or trust approaches might be recommended to the tax administration to increase tax compliance (see also Alm & Torgler, 2011). The authors claim that supervision appears to crowd out the intrinsic motivation of taxpayers even if trying to set a personal relationship with them (see also Feld & Frey, 2002; Torgler, 2002).

In summary, we cannot find definite evidence on the positive effects of deterrence on compliance. Moreover, of all of the A-S parameters that can be potentially used as policy rules only the probability of audit/detection appears to be available with some degrees of freedom. However, the contradictory results about its effects are probably due to the fact that we do not understand yet how the agents form this probability. Thus, to appropriately model these beliefs' formation may be an interesting research line in the future, having in mind as well that people might be heterogeneous when forming these beliefs, and that heuristics, bounded rationality or even biases may separately or jointly be part of the process.

Robust fact 1: Observed rates of tax compliance in most countries around the world are higher than those predicted by the standard model. This (apparent) failure of the standard model to accurately predict actual tax compliance strongly suggests analyzing other psychological and social factors.

1.3 Non-deterrence arguments (Tax Morale)

As we have seen, A-S' deterrence approach cannot explain satisfactorily the observed tax compliance rates around the world. Alm (2019), in a broad coverage of the tax compliance

literature, says that individuals are obviously heterogeneous, then some may be motivated only by financial outcomes, but others may have different preferences including non-pecuniary elements. A growing literature has grouped the latter under the ample term "Tax Morale" and this concept includes various motivations like loss aversion, peer effects, reciprocity, and social norms, etc. but also cognitive aspects like biased perceptions, bounded rationality, and the application of mental heuristics.

In what follows, I discuss some of the factors and evidence provided in what regards the taxpayers' motivations, pointing out what we know so far, and how this thesis may contribute to better understand them. This review will help to support the theoretical model and the hypotheses derived from it. It also provides a context for the experiment that serves to test its predictions. I organize this review in several sections, each one corresponding to a potential factor affecting the taxpayers' motives.

1.3.1 Taxpayers' satisfaction with the public goods funded with their taxes

Alm (2019) reminds that the most important issue regarding public goods' contribution is how to influence the individuals' willingness to cooperate in order to avoid the 'free-rider' problem. In this vein, taxpayers may decide to contribute based on their evaluation of public goods and services amount and quality, for example, Alm and Gomez (2008) use data from the survey of Spanish Fiscal policies with 2,483 Spanish citizens over 18 years old. They set "Tax Morale" as a dependent dichotomous variable and various questions of the survey as independent variables. They then run a Probit estimation and find that one-unit increase in the individual perceptions of the benefits to society derived from public goods delivery increases Tax Morale by 7.4 percentage points. Similar results are provided by Cummings, Martínez-Vázquez and Torgler (2005), who found evidence of a substantial improvement in the Tax Morale in Spain from 1981 to 2000, precisely in those years coincident with democracy and institutional improvement.

Also, Mascagni et al. (2017) run a large (approximately 9 thousand subjects) field experiment in Rwanda in which they sent a combination of three message contents (deterrence, information about public goods, reminder of payments) and three delivery methods (letter, email, SMS), and they compared them to a control group that received no message. The messages designed to underline either deterrence or information about public goods also included a gently reminder of deadlines and were personalized with taxpayers' names and accompanied by images: a justice hammer for deterrence and a graph showing how tax revenue is spent in public goods and services. All messages were signed by the highest tax authority and

sent through official channels a month before the annual declaration deadline. Sometime after the deadline they run a two-part Tobit model, calculate the overall revenue gain obtained by the treatments relative to the control group and find an increase in compliance in the range of 16.0 to 23.7 per cent. They also find that messages including both information about public goods and gentle reminders are more effective than those including deterrence (that appear to work mainly for small taxpayers). Finally, they emphasize that revenue gains of this intervention are far superior to the modest cost of sending messages.

However, there still exist very reasonable doubts on determining people's motivations to voluntarily contribute to public goods' provision based on what they feel or perceive about the actual use of their taxes [14].

1.3.2 Institutional setting, trust in government, and perceptions of corruption

Alm (2019) claims that the social and institutional environments in which individuals live affects compliance and this has been consistently demonstrated by empirical findings of differences in compliance behavior in countries with similar fiscal systems (e.g. tax rates, audit rates, fine rates) but different social and institutional environments (Alm, Sanchez & De Juan, 1995; Cummings, Martinez-Vazquez, McKee & Torgler, 2009; Andrighetto, Zhang, Ottone, Ponzano, D'Attoma & Steinmo, 2016). It has also been found that individuals who have a negative attitude towards government tend to comply less, both in the laboratory (Webley et al., 1991) and in the real world (Pommerehne & Weck-Hannemann, 1996). Further, 'trust' in institutions affects the viability of government policies: when individual trust in government is greater, enforcement tends to be more effective in deterring non-compliance.

In one of the pioneer empirical works on this broader view, Smith (1992) uses the Taxpayer Opinion Survey (TOS)[15] to perform a multivariate analysis showing the effectiveness of alternative policies over those based on deterrence. He claims that taxpayers would improve their compliance if they consider that government services are worth the paid tax and concludes saying that tax law should consider specific rules that give taxpayers more autonomy and supports trustfulness as a motivation to pay taxes. He also finds that trust in the president, the belief that other individuals obey the law and a pro democratic attitude have significant positive effects on tax morale.

[14] Indeed, Luttmer and Sighal (2014) criticize this evidence saying that it has been obtained from data that ignores the fact that the relationship between taxpayers and governments is built along the years and also involves many other situations not directly involved with tax, for example: the institutional setting, democratic participation, and even more subtle aspects like authorities' attitudes, their behavior or even their sympathy.

[15] A survey collected in the United States in 1987 that provides a wide source of taxpayers' opinions and evaluations of the tax system, the Internal Revenue Service, tax evasion, etc.

Another example is provided by Feld and Frey (2002) who use data of Swiss cantons for five different years during the period from 1970 to 1995 and find that a respectful treatment from authorities to taxpayers, decreases in 5.726% the ratio of income evaded as a percentage of true income. In contrast, when the tax officials consider taxpayers purely as 'subjects' who have to be forced to pay their dues, taxpayers tend to respond by actively trying to avoid taxation (for similar results see also Kastlunger, Dressler, Kirchler, Mittone & Voracek, 2013).

More empirical evidence is provided by Cummings et. al. (2009), who run a lab-experiment with university students in Botswana (99 subjects) and South Africa (88 subjects), and whose setting imitates a real annual tax process (including deterrence). All participants had prior experience filing their own taxes and although younger and better educated than the general population, they were similar in terms of education and incomes across the two countries. The experiment controls all other factors not related to the institutional environment. Authors use a Tobit estimation and show that participants in South Africa exhibit lower compliance (statistically significant at the 0.05 level). Thus, they claim that low quality governance causes a negative effect on compliance. Results also suggest that compliance increases when people perceive that the governance is good, and that deterrence has less impact in those countries in which governance is worse.

Torgler (2003) uses the World Values Survey and the TOS to check determinants of tax morale in 17 European countries and the US, then he runs two models (a weighted least squares and a weighted ordered probit) and finds that an increase of trust by one unit increases the share of people stating that tax evasion is never justifiable between 3.3 and 4.1 percentage points. He also claims that trust in the president is even more important for tax morale in developing countries because in those environments, taxes can be even seen as a price paid for government's positive actions to face greater problems.

Indeed, some other authors have paid exclusive attention to the determinants of trust (e.g., Scholz & Lubell 1998; Wintrobe 2001; Torgler, 2002 2004). For example, in a recent empirical work, Jimenez and Iyer (2016) also study the effect of trust in government (among other variables) on tax compliance. They use a sample of 217 US taxpayers and claim that people may judge actions of an entity as fair or unfair depending upon how much that entity is trusted. As this specific work is mostly related with the concept of social norms in general, I will provide more detail of it in the next section which is devoted to that topic. In summary, these works suggest that trust in public authorities might tend to increase taxpayers' positive attitudes and commitment to the tax system and tax-payment, which has finally a positive effect on tax compliance. However, there are many different elements worth to be analyzed separately

but most of them have arose from surveys and only recently but scarcely from experiments. Thus, I plan to analyze them in a manner in which an act of voluntary compliance can be directly related with respondents' opinions or attitudes toward the authorities (efficiency or corruptness). Moreover, I consider trust in (or the opinion about) the president crucial because its figure (mostly ignored before in the literature) appears to be, overall in underdeveloped countries, the most important personification of the government (see Torgler 2003).

1.3.3 Social norms, intrinsic motivations and cultural characteristics

Alm (2019) thinks that much of the individual behavior can be broadly viewed as a 'psychological contract' between individuals (and also between individuals and governments) and a central item of this contract is the concept of 'social norm' (Elster, 1989). The author says that "a social norm represents a pattern of behavior that is judged in a similar way by others and that is sustained in part by social approval or disapproval". Therefore, individuals usually follow social norms for different reasons than the fear of legal punishment.

Also, Alm (2013) points out that a social norm is process-oriented, a very different object from that of the outcome-orientation of classic individual rationality. Then, he suggests some ways in which social norms can be introduced in standard theory. For example, through a 'Reference Point' like Kahneman and Tversky (1979) where the social norm may be achieved by reporting all income and paying all taxes so that an individual who underreports or pays less than her liability suffers a loss in utility. In fact, this last concept is what I will develop later in the model that is also central to this work. I should say however, that not always a social norm may induce compliance and it ultimately depends on what is accepted by most members of the social group (see for example: Myles & Naylor, 1996; Fortin, Lacroix & Villeval, 2007; Traxler, 2010). Even more, some social norms may be widely accepted but harmful for the own social group in which they are dominant, e.g. violence, misogyny, discrimination, etc.[16] Therefore, in a social group in which the government is perceived as corrupt, non-democratic or inefficient, a social norm may implicitly command the members not to contribute, for example as a way of evading taxes.

In one of the first empirical works on social norms and tax compliance, Torgler (2004) compares Costa Rica and Switzerland. He uses data from the Latinobarometro study of 1998 for Costa Rica and the World Values Survey (WVS) for Switzerland, analyzes both countries separately using the compliance rate as the dependent variable and runs Tobit maximum

[16] See the brief 'Changing cultural and social norms that support violence' elaborated by the World Health Organization: https://www.who.int/violence_injury_prevention/violence/norms.pdf

likelihood estimations. The author finds that over time the compliance rate in Costa Rica is mostly higher than in Switzerland. In general, he claims that internal social norms have a positive effect on tax morale.

Jimenez and Iyer (2016), mentioned in the previous section, collect information of 217 US taxpayers, through a survey, on taxpayers' political party identification, trust in government, fairness perceptions and compliance intentions. Then they run a structural equations' model in which the dependent variable is the likelihood of a taxpayer to comply with tax laws in a scenario where she may perceive an opportunity to evade taxes. Their results indicate that social norms have a positive and significant influence on taxpayers' compliance. However, social norms only influence compliance indirectly through internalization as personal norms.

Also, Hallsworth et al. (2017) develop a large-scale field experiment in the United Kingdom (100,000 individual taxpayers who failed to pay on time). They issue letters with variations of social norms' messages as alternative treatments in addition to a neutral control one. Treatment letters were phrased some in a positive and some others in a negative way, being the strongest one 'nine out of ten people in the UK pay their taxes on time. You belong to the very small minority of people who have not paid yet'. Their results show that all letters increase the probability of collecting unpaid taxes, being the greatest effect that of the strongest version mentioned. Nevertheless, even though this treatment was designed to test social norms its effect may also be related to deterrence since the tax administration showed clearly that it knew that the recipient of the letter has not complied.

Evidence on intrinsic motivations is provided by Torgler and Schneider (2005) who take data from the 1990 World Values Survey (WVS) and the 1999 European Values Survey (EVS) and analyze the attitudes of society towards paying taxes in Austria with a pooled regression model. They find that the impact of social variables on tax morale is strong, especially pride. Indeed, when pride increases by one unit, tax morale increases by 9%. Also, Dwenger, Kleven, Rasul and Rincke (2016) present a case of pure voluntary compliance in a German Protestant church where its authorities set a fixed-rate but completely voluntary tax, and find that even though contributions were heterogeneous, there was a sharp peak at the exact level of owed tax which would reflect one specific form of intrinsic motivation: a desire to comply with the law.

Furthermore, Luttmer and Sighal (2014) claim that if we introduce intrinsic motivations like Ethics and Morality in the utility function we may be able to better explain compliance because if a moral individual is one who considers paying taxes as the ethical norm then if the individual behaves differently she may suffer a psychic cost. On the contrary, an amoral individual has a different ideal behavior and he may even feel happy with noncompliant

behavior. Therefore, they suggest that every individual has two different components in her utility function. The first part is the standard expected utility and the second part is what they called a "moral identity utility", which is the gain or loss in utility from conforming or not to an individual's ideal behavior. Indeed, I somehow follow these suggestions, that also with other related ideas, are useful to set a utility function based on norms that I will develop from chapter 2 and beyond (see also López-Pérez 2008, López-Pérez, 2010).

There is another interesting idea provided by Torgler (2003), who outlines the importance of rules to understand tax morale and tax compliance. He thinks that focusing on rules implies analyzing the process of tax honesty and not just the outcome (see also Alm 2013). The author analyzes tax morale empirically as a dependent variable and wonders what are the reasons why people are more co-operative than seems to be rational given the enforcement structure? He says that one reason might be that individuals have the tendency to follow specific rules rather than acting in the line of standard economic rational choice theory. Taxpayers may follow rules they know or trust to produce good results. For instance, filling out the tax form is an activity repeated every year and the latest tax forms are often taken as a reference point. Thus, uninformed taxpayers may rely on other people's knowledge, e.g., what they are told by friends, co-workers or family. This way, a taxpayer follows a rule instead of optimizing case by case. And this interpretation is also near to Herbert Simon's (1955) 'theory of satisficing' which claims that in crucial and unknown situations 'bounded rationality' turns to be of great importance. Following rules helps to minimize information costs. Again, Simon focuses on the process rather than the outcome of decision making. Rules derive from or are part of social norms and under this premise it is costly in terms of utility to deviate from them (both in time and effort).

In the same paper, Torgler (2003) defines various types of taxpayers. He says that one of them, the group of 'Social Taxpayers' is deeply influenced by social norms, they feel guilty when evade or under-report and are not detected and feel embarrassed when evade or under-report and are detected (and punished). They are thoughtful to other people beliefs (especially of those people close to them). Also, they are conditional co-operators. If they perceive that other people comply, they also tend to do so. The author also identifies other three types: the 'Intrinsic Taxpayers', 'Honest Taxpayers' and 'Tax Evaders'. This classification is in part a motivation for my later modeling as I will develop from the following chapter.

Finally, the work of Cummings et al (2009), also mentioned in the previous section, finds significant differences in compliance behavior between Botswana and South Africa, and authors claim that it is due to social or cultural factors. In fact, Transparency International's

Corruption Perception Index, which relates corruption perceptions of various countries' government, indicates that Botswana's score is some 20 percent higher (better) than that of South Africa. It means, Botswana fights corruption better than South Africa. Similarly, the rule of law index, which measures the degree of confidence in and compliance with the rules of society, is more than three times larger in Botswana. Coincidently, their results show that participants in South Africa exhibit lower compliance (statistically significant at the 0.05 level). Additionally, to reinforce the results, an alternative explanation of differences in risk attitudes is rejected by the data (for similar results see also Tsakumis, Curatola & Porcano, 2007).

1.3.4 Peer-effects

The concept of peer-effects is much related or even part of the broader concept of social norms that however appears to have a separable and identifiable influence on tax compliance since taxpayers' decisions are usually made in the context of other taxpayers' decisions, a determined environment or reference group. For example, for income tax the reference groups could be the family members, co-workers or friends, and this is an issue I will explore later in this work.

By the moment, please let me put this in context, for example Kahan (1997) assures that there is ample evidence of a general trend of individuals to adjust to other people's behavior and expectations even to commit all sorts of crimes, including theft, homicides and tax evasion. He says that there is a strong correlation between a person's obedience to the law and her perception about other people's obedience (Harold, Grasmick & Green, 1980; Gibbs, 1978). He goes further and claims that a person's perceptions on if other people in her situation pay taxes, play a more important role in her decision to pay than her perception about the expected punishment for evading (see also Battiston & Gamba 2016).

Further, Luttmer and Sighal (2014) claim that if individuals imperfectly perceive the enforcement environment, the behavior of peers may influence their beliefs about the consequences of tax evasion. Direct evidence on this is provided by Torgler and Schneider (2005), whose work is detailed in the previous section. These authors find that an increase in one point in the scale of the perceived tax evasion reduces the share of individuals stating that tax evasion is never justifiable by around 8 percentage points (a decrease in tax morale). They also claim that it appears to exist a crowding out effect when individuals notice that others are not complying. More similar evidence is provided by Torgler (2004) who, after analyzing the results of tax morale in Costa Rica and Switzerland with an Ordered Probit model, finds that an increase in the perceptions that other taxpayers obey the law and consider negatively tax avoidance produce an increase in tax morale (with a 5% significance).

Also, Nageeb and Benabou (2016) say that visibility is a powerful incentive and remind that many public and private entities use the esteem of individuals as an incentive, and also many States and cities used updated forms of public punishment e.g. in Greece, tax authorities have published the lists of tax evaders and in Peru, those convicted for tax evasion can be shut down permanently; and some municipalities issued an honor list of families who pay promptly their taxes (Del Carpio 2014). Also, Baldry (1987) presents some experiments' results showing that the moral costs associated with public disclosure of evasion are important determinants of tax compliance, while Gächter (2007) presents experimental evidence that suggests that, ceteris paribus, the probability that someone evades taxes is greater if she thinks that other people behave alike, idea also shared by Frey and Oberholzaer (1997)

Onu and Oats (2015) say that a number of studies on taxpayer interaction, from large-scale surveys to field experiments, reveal that people's tax compliance attitudes and behavior change after they discuss about taxes with other taxpayers. They claim that communication may affect taxpayers' perceived risk of being caught and it is also likely to influence the strength of social norms. Similarly, Alm and Gomez (2008) find that the perceived size of tax fraud has a direct influence on the intrinsic motivation of individuals to pay taxes thus they claim that public policies to fight evasion should take them into account.

In a very interesting and large field experiment, Stalans, Kinsey and Smith (1991) wonder how do people form beliefs about sanctions and norms toward the legal system in the context of income tax reports. They use data from a telephone survey of 1,200 Minnesota adult residents, run a maximum likelihood model and find that communication with co-workers lower the perceived likelihood of IRS detections for overstating deductions (at 5% significance). This co-workers influence lowers the perceived severity of informal sanctions for tax cheatings (0.25%), and the likelihood of feeling guilty if under reporting income (0.17%). In contrast, communication with family members enhanced (at 10% significance) the perceived fairness of tax laws (0.08%) and the likelihood of feeling guilty if under reporting income (0.14%). I keep this in mind to later propose measuring the influence on individuals' decisions of other taxpayers in general but also, and more specifically, of members of their reference groups.

I can also cite the work of Battiston and Gamba (2016) who run an experiment with 108 bakeries in Italy. The experiment starts when an agent entered the bakery and bought a loaf of bread, and if the receipt was not released, she would ask for it, being this request their treatment. Then, some minutes after the first agent left the place, another agent also entered and follows the same procedure. Whatever was the behavior of the seller, the second agent never asked for a receipt. Their results show that direct peers pressure increases by 17.4% the propensity of

sellers to issue a receipt in coming transactions (with a 10% significance). They also find that every request for a receipt causes the seller to issue approximately 2.4 additional ones, and that the probability of receiving a receipt is significantly lower when a client is of the same gender than the seller (-13.6%). The authors suggest that illegality increases with complicity, which increases when individuals belong to the same social group (in this case, the gender). Finally, authors claim that their study strongly supports the convenience of influencing the behavior of sellers through soft incentives (positive or negative) to strengthen social norms and the diffusion of best practices.

Nevertheless, Del Carpio (2014) runs a field experiment on property tax collection in two municipalities of Peru and finds that a treatment combining information about peer compliance and a payment reminder causes a statistically non-significant increase in compliance in comparison to a control group with only a payment reminder. Also, some other field experiments in high-compliance contexts where notifying taxpayers that over 90 percent of individuals comply have failed to find significant effects either (Slemrod, Blumenthal & Christian, 2001; Fellner et. al. 2013). Indeed, Luttmer and Sighal (2014) claim that this failure may be due to the fact that individuals already had a clear sense of overall compliance influencing their decisions instead of a mere informative number.

As a summary I would say that peer-effects appear to be very important to explain compliance, but it also appears that they are even more powerful when coming from a reference group (Battiston & Gamba, 2016; Nageeb & Benabou, 2016; Onu & Oats, 2015; Stalans et. al. 1991). However, evidence is not conclusive.

1.3.5 Socio-demographic variables

Alm (2019) claims that there is consistent evidence that compliance may be motivated, or at least affected, by various demographic variables. He reminds that some analysis of TCMP data suggest that compliance tends to be lower for individuals who are younger, single and self-employed (Clotfelter, 1983; Witte & Woodbury, 1985; Dubin & Wilde, 1988; Dubin, Graetz & Wilde 1990; Feinstein, 1991; Erard & Chih-Chin, 2001). He points out that there is also laboratory evidence that compliance decrease with higher probability for men (Finocchiaro & Rizzo, 2014), and for younger individuals who do not fill their own tax reports (Friedland et al., 1978; Baldry, 1987; Alm et al., 1992, 2017, 2017a; Alm & McKee, 2004, 2006; Kastlunger et al., 2010). He also says that the effects of most other demographic variables are uncertain and there exists a high heterogeneity of individual behavior, which has been consistently confirmed since Vogel (1974) to more recently with Torgler (2003) where it is true that

individuals who are otherwise identical but differ only in (say) age exhibit very different compliance behaviors.

Also, Beron, Tauchen and Witte (1988) (whose work was mentioned in prediction 5 of section 1.2) find higher compliance in areas with less educated and older taxpayers, with a large proportion of families headed by women and a mostly native-born population.

Finally, Kastlunger et al. (2010) find that women show higher tax compliance than men but claim that this might be better explained by differences in socialization, self-image, and femininity–masculinity traits, rather than by biological differences.

1.3.6 Fairness, inequity aversion and "just world" perceptions

Fehr and Schmidt (1999) defines 'inequity aversion' as the human resistance to inequitable outcomes. The authors say that some people would like to sacrifice benefits to themselves in order to avoid inequitable outcomes, not only when they receive less than others (disadvantageous inequity aversion) but also when they receive more (advantageous inequity aversion). For example, Wintrobe (2001) claims that ''as long as people believe that the tax code is fair, they will be more willing to pay their taxes''.

Also, Lü and Scheve (2016) say that if individuals have aversion to inequity a greater one can induce them to prefer higher levels of taxation and redistribution. The authors conducted survey experiments in France and the United States with 2,175 and 2,487 subjects respectively and evaluate how income variation of the recipients of many different tax policies influence support for those policies. They set a utility function that exhibits a self-centered inequity aversion, incorporate this utility function into standard models of tax preferences, run a Probit Model and find that individuals not only care about the effect of tax policy on their own incomes but also exhibit advantageous and disadvantageous inequity aversion. Finally, the authors find that in France both disadvantageous and advantageous inequity aversion are important determinants of tax policy preferences. Nevertheless, in the United States, they find strong evidence only of disadvantageous inequity aversion but not of the advantageous one.

Bazart and Bonein (2014) perform a laboratory tax game, with complete and perfect information, and a pool of 288 undergraduate students. The authors introduced an inequitable situation in which the government states two groups of identical taxpayers but one of them with a higher tax rate (disadvantageous inequity). All subjects know their rate and that of the other group. The authors find that, overall, 48.54% of subjects honestly reported their income, 19.58% of taxpayers were full evaders and the remainder corresponded to partial evasion cases. Moreover, those enjoying the lower tax rate ("advantageous inequity"), reported on average, a

higher income than those having the higher tax rate. The authors claim that benefiting from the lowest tax rate or suffering from the highest one strongly impacts taxpayers' reported income. Even though it appears that this experiment deals on the tax rate as a policy rule, its actual intention is to prove how subjects react to discriminatory treatment from government. Therefore, in case of disadvantageous inequity, highly sensitive taxpayers will not report fully their income and express negative reciprocity towards government.

Let me provide now some discussion about the 'Just world hypothesis', an element very related to inequity aversion and, also a likely determinant of compliance. Lerner (1980) claims that "Individuals have a need to believe that they live in a world where people generally get what they deserve." For example, Benabou and Tirole (2006) set a model, then test it using international surveys and find ample differences among countries on the views that people have about the causes of wealth or poverty and if a person is responsible or not for her own destiny. The authors claim that because of the uncertainty about the future, many people motivate themselves and their children toward effort, more education, perseverance and to be away from laziness, welfare dependency, etc. Then if enough people have the view that economic success is highly dependent on effort, they will constitute a powerful aggregate vote in favor of lower tax rates. As a result of their study, they find two equilibria. A first, "American" equilibrium, characterized by a high prevalence of just-world beliefs and a relatively laissez-faire public policy. And a second, "European", characterized by more pessimism and a more extensive welfare state. In the latter, agents are also less likely to blame poverty on a lack of effort or willpower, but aggregate effort and income are lower than in the first equilibrium.

Indeed, Di Gioacchino and Patriarca (2017) present a theoretical variation on the Benabou and Tirole (2006) model in which they study the role of income inequalities in a standard model of tax compliance with social norms. They introduce progressive taxation and/or regressive fines causing that incentives to comply become decreasing in income and find that higher income inequality increases the value of evasion while overall social norms are unaffected. After that, they find that group specific social norms amplify the negative effects of inequalities (the difference between the tax compliance of the two groups and the value of tax evasion increase while overall social norms are constant). Finally, they conclude that policies aimed at increasing compliance should rely on the social norms effects, instead of higher deterrence.

There exists evidence pointing out that people may decide (fully or in part) their contributions to public goods (e.g. by paying taxes), regarding their preferences about equity

and/or their beliefs about how fair is the society or the environment in which they live and/or work.

1.3.7 Some evidence on public policies' proposals to improve tax compliance

Many theoretical and empirical works are now a worth source for governments and local authorities to design and execute public policies aimed to improve tax compliance. In fact, Alm (2019) wonders how to better use those works and categorizes them into three 'paradigms' for tax administrations: deterrence, service and trust. He says that trust is based on individual's moral values and on those of others who influence them and claims that 'trust' in the authorities – and in other individuals – can have a positive impact on compliance.

However, in a critical review of various empirical works, Luttmer and Sighal (2014) argue that if tax morale is truly important for compliance then some simple nudges such as better presenting information or sending polite payment reminders would reduce tax evasion (Del Carpio 2014; Hallsworth, 2014; Dwenger et al. 2016). Nevertheless, they point out that the direct evidence from field experiments attempting to manipulate some elements of tax morale is mixed. They think that those successful experiments have been acted only on "small stakes"; and on simple decisions like paying taxes on time or paying relatively small taxes and fees. They indeed do not deny the importance of tax morale but think that there are some likely explanations for this lack of convincing evidence. First, it could be that tax morale's channels do exist but would be small in comparison to those of the standard model. Second, it could be that tax morale is important, but inelastic, for example, in a model with honest and strategic taxpayers, intrinsic motivation may have a large effect on overall compliance (for the honest taxpayers), but moral suasion interventions may not affect behavior of either group. Also, many tax morale channels could be inelastic to the types of interventions tested in experiments, for example, designing field experiments to affect culture would be very difficult. They finally say that the effects of these interventions appear to be also influenced by both the context (different levels of compliance) and the personal characteristics of the taxpayer (intrinsic versus extrinsic motivation, peer effects or reciprocity strength, etc.). Therefore, identifying subjects, groups and motivations would be extremely difficult in order to design appropriate treatments.

Sharing the same critic position, Ariel (2012) says that in large field experiments, it was very common to issue a threatening letter (deterrence), and a letter that reminded taxpayers of their duty to pay their taxes (moral suasion). So that, any relative change in reporting behavior was attributed to the content of the letter exclusively. The author says that some evidence supports the moral approach (e.g., Coleman, 2007; Schwartz & Orleans, 1967; Wenzel &

Taylor, 2004), but the causality appears to be weak (Slemrod et. al. 2001, p.128). And, on the contrary, other studies provided evidence to support the deterrence approach like Slemrod et. al. 2001 but only for certain groups of taxpayers, and not for others (see Paternoster and Simpson, 1996; Simpson and Koper, 1992). Even more, some other works could not find statistically significant differences between the experimental and the control groups (McGraw & Scholz, 1991), and finally, some even reported a counterproductive effect (Slemrod et. al. 2001; Wenzel, 2002, 2006), it means the letters produced a decrease in compliance apparently as a sign of defiance (Bouffard & Piquero, 2010; Sherman, 1993, 2010).

Hasseldine, Hite, James and Toumi (2007) propose an explanation for these contradictory results, they point out that wording differences may be one of the reasons for the different outcomes. For example, Slemrod et. al. (2001), Wenzel (2002, 2006), and Torgler (2004) tested the effect of moral persuasion texts, but the tone of the letters was indeed different. Thus, even though their research methods were very similar, their outcome differences may be attributed to different operational settings (see also Mascagni, 2018). Furthermore, they remark that the studies were conducted in different countries (Australia, the United States, Switzerland, the United Kingdom, and Ireland) with different social settings and compliance cultures (Alm & Torgler, 2006); and it also could be a result of economic and demographic factors because most studies reported effects that were conditional on the taxpayers' earnings (e.g., Wenzel and Taylor, 2004). Finally, Blumenthal et. al. (2001) provided another plausible explanation for these differences based on the opportunity to evade of each group of taxpayers (see prediction 5 discussion in section 1.2 above).

There may exist other alternatives to design new policy rules to improve compliance apart from sending e-mails, messages or letters using deterrence or moral suasion. One of them is provided by Kirchler, Hoelzl & Wahl (2008) who explore the importance of effort in truthful reporting. The authors wonder if the effort applied to earn taxable income affects compliance decisions. They remind that economic theory predicts that previous costs should not affect present decisions, but on the contrary, psychology thinks that previous investments of money, time, or effort do matter. Then it is possible that either taxable income earned by high effort is subjectively of higher value and therefore more likely to be evaded, or that investments of effort cause a shift of the reference point through the establishment of an aspiration level, resulting in honest declaration of income. They run two experiments in a business simulation in which taxable income was obtained by different levels of effort. Results show that tax evasion was more pronounced in low-effort conditions then it seems possible that effort changes the reference point inducing a higher risk-aversion and thus decreasing the predisposition to evade.

Therefore, authors propose that since tax authorities cannot audit all taxpayers, they should audit reports on easily earned money (e.g. financial market or capital gains) instead of those whose income was originated by other hard-working activities.

Therefore, it appears that there is room enough to try other different public policies to improve compliance, and like in this thesis, to even try messages or communications but in a more isolated and controlled environment than in the field.

1.3.8 Empirical evidence for Latin-America

There are just few empirical works on tax compliance in the region. Indeed, the Latinobarometro Corporation[17] reports from 2009, 2013 and 2015 find that many scopes of citizens' behavior, including by all means the payment of taxes, have a high statistical relationship with the citizens' perception that governments work for the well-being of all, or other indicators related to disenchantment on politics. These indicators are at the time of the measurement still a minority perception in most Latin American countries, with countries where this certainty almost does not exist like Argentina, Dominican Republic and Peru. Further, Ortega et al. (2016) study citizens' attitudes to tax obligations by means of surveys implemented in 17 cities of Latin America. They find a statistically significant relation between a responder's will to pay taxes and her perceived government's performance e.g. people would correspond positively if the government improves the quality of its services (social attendance, crime fighting, health and education) and also if institutional improvements in aspects like transparency, corruption and the effectiveness in the collection of taxes occur.

Additionally, International Transparency publishes an annual global study about perceptions of corruption in the public sector, which in its 2014 edition places Peru in the 85th position among 174 countries (as well as for the previous three years). Therefore, the perceptions of Peruvian citizens about the corruption of their authorities appear to affect any relation with politics and politicians or even any public institution ran by the government, situation I will explore in the following chapters.

More in detail, the 4th. National Survey on Perceptions of Corruption of 2010[18] in Peru reveals interesting data on the tax voluntary compliance, among others, that 79% of the people declared to be high or moderately tolerant with tax evasion if they know they are not going to be detected, and that 82% of the people declared that they do not request invoices to avoid the

[17] http://www.latinobarometro.org/lat.jsp
[18] IV Encuesta Nacional sobre Percepciones de la Corrupción en el Perú, 2010. http://www.scribd.com/doc/36168016/Sexta-Encuesta-Nacional-Sobre-Percepciones-de-la-Corrupcion-en-el-Peru-2010.

payment of the Value Added Tax (VAT), even though these same people consider that the main problem in the country is the corruption and that tax evasion is one of its more frequent forms.

In another study made by the Peruvian Tax Administration[19], even though people interviewed considered mainly that "paying taxes is right", they also said that they would evade if they are not going to be detected, they invoke reasons such as "I do not want to give money in exchange for nothing", "others do not pay either", "others do it and it is not necessary that I do it", "nobody forces to me to do it", etc.

In one of the first empirical works in the region, Torgler (2005) analyzes quantitatively the tax morale in Latin America considering it as a dependent variable and searches for factors that systematically affect it. He works with two data sets: Latinobarometro and World Values Survey, looking at individuals' perception of reasons for tax evasion and finds that the tax burden, lacking honesty, and corruption are the main factors mentioned by individuals. Furthermore, trust in the president and the officials, the belief that other individuals obey the law and a pro democratic attitude have a significant positive effect on tax morale. The author also finds that countries with high tax morale have low rates of individuals stating that they know/heard about tax avoidance and claims that one reason to explain evasion might be that individuals in low-tax-morale countries notice that many individuals evade taxes which crowds out their intrinsic motivation to comply. He finally concludes saying that the presence of corruption also appears to undermine citizens' tax morale.

Other more recent empirical work is that of Castro and Scartascini (2013), who report the results of a large field experiment in Argentina. They chose approximately 23,000 taxpayers in the Municipality of Junín, then subjects were randomly divided into 4 groups. One of the groups received no treatment (control); the other three were treatments that include messages in their tax bills. The treatments were: deterrence (information about the cost of noncompliance), moral suasion (information about other taxpayers' compliance), and fairness (information about public spending). Their results show that the most effective message was one based on deterrence (stating the actual fines and potential legal consequences of noncompliance), authors claim that tax compliance increased by more than 4 percentage points in this case. On the other hand, no average effects are found for the remain treatments.

On the contrary, Carrillo, Pomeranz and Singhal (2017) in another field experiment in Santa Fe (Argentina) use a unique setting where a public good, namely, 400 individual

[19] Study released in the 45th. General Assembly of the Inter-American Council of Tax Administrations (CIAT), Quito, Ecuador, April of 2011 under the title "The Creation and Reinforcement of the Fiscal Concept of Citizenship: Fiscal Education Programs". The data was obtained from a Survey on tax compliance taken to 8 thousand households in Peru in 2009 by DATUM Cia.

sidewalks, is randomly assigned to taxpayers who did not have any outstanding property tax payments and find that this public goods' provision increases the probability that they will keep complying, compared to other good taxpayers used as control.

Another very similar and large field experiment includes 20,000 eligible taxpayers with unpaid tax liabilities between 2011 and 2013 in Colombia (Ortega & Scartascini, 2016). The authors test three delivery methods: letters, e-mails and personal visits. The authors believe that since 'actions may speak louder than words' taxpayers would update their perceived probability of detection depending on the delivery method, so that the more selective and costly ones may imply higher deterrence effects. The subjects of the experiment were divided in four groups that received either the same message, with the three different methods, or no message at all. The message contained information about taxpayers' balance and some details of their unpaid tax. Then, an explicit element of deterrence was included by underlining the consequences of not paying tax, such as penalties and potential prosecution. Finally, an appeal to national pride and social duty ('Colombia, a commitment we can't evade') concluded the message. Personal visits by tax inspectors delivered the same information, following a precise protocol. They find large and highly significant effects across delivery methods, being the personal visit by a tax inspector the most effective one. Similar results are provided by Del Carpio (2014).

Finally, Dunning, Monestier and Piñeiro (2017) study a lottery done in the municipality of Montevideo (Uruguay) with the purpose to increase compliance. This lottery randomly assigned a year-long tax holiday to eligible taxpayers (those who do not have debts and paid on time in the previous year); this was the treatment group and the control group was obtained selecting those eligible taxpayers who did not win. The final sample was of 6000 good taxpayers, divided in equal numbers of winners and non-winners. The results show that winning the lottery has a negative effect on compliance that lasts for 3 years. The authors argue that the main element causing this negative effect is the cut in the habit of paying taxes. Moreover, the authors find that only 8% of taxpayers correctly identify the lottery as a municipal reward. They also issue three sets of letter treatments to all taxpayers: a simple reminder of deadlines; one with information about the existence of the lottery; and one with deterrence messages. The authors could not find significant effects of treatments in comparison to the control group. Finally, they conclude highlighting the crucial importance of evaluating any policy to improve compliance because of the uncertainty about their final effects.

Robust fact 2: Deterrence appears to be undeniably important, but there is also empirical evidence that it can be counterproductive by crowding intrinsic motivations out. Moral suasion also appears to be important, but its empirical evidence is mixed, probably due

to the way it has been introduced in the experiments. Therefore, there still exists a big concern to find concrete non pecuniary elements that influence voluntary compliance. For example, we would like to know if, for that decision, citizens consider aspects like: the amount and quality of public goods and services the government provides, the quality of the treatment they have received from the government (or their perceptions on it), their beliefs about government's truthfulness or corruption, some cultural and social aspects very much related with the societies they live in, their beliefs about the contribution of other people and overall those belonging to the same family or social group, and even their sympathy for the president or the authorities.

Therefore, let me start with the theoretical model that will serve to test the hypotheses deriving from these facts.

Chapter 2.

A utility model with norms

2.1 General setting

To study the choice under uncertainty of a decision maker (called Zoe), let Ω denote a finite state space, where a state $\omega \in \Omega$ fully specifies all relevant features of Zoe's environment, and O denote the set of outcomes. An act is defined as a function $t: \Omega \rightarrow O$. Zoe's choice set $\mathbb{C}$ is a subset of the set of all acts, or mappings from Ω to O. Zoe has prior beliefs on Ω, quantified by a finitely additive probability measure π mapping each state ω to a probability $\pi(\omega) \in [0, 1]$. Pair $(\mathbb{C}, \pi)$ is the *choice scenario*.

Definition 1 (norm): A norm is a correspondence ψ that assigns a nonempty subset of $\mathbb{C}$ to any choice scenario $(\mathbb{C}, \pi)$.

Act $t \in \mathbb{C}$ respects norm ψ in scenario $(\mathbb{C}, \pi)$ if $t \in \psi[(\mathbb{C}, \pi)]$, where $\psi[(\mathbb{C}, \pi)] \subseteq \mathbb{C}$ is the image of $(\mathbb{C}, \pi)$ according to ψ. If act $t \in \mathbb{C}$ is not selected by ψ in $(\mathbb{C}, \pi)$, in contrast, it constitutes a *deviation* (of ψ) in that scenario. Without loss of generality, I assume that Zoe has internalized some specific norm called the E-norm, to be described later, which means that she dislikes deviating from it. More than this, Zoe has a metric for deviations so that some are 'worse' or 'more deviated' than others.

Definition 2 (deviation function): For any scenario $(\mathbb{C}, \pi)$ and norm ψ, a deviation function $d: \mathbb{C} \rightarrow [0, 1]$ is such that $d(t) = 0$ if t respects ψ in $(\mathbb{C}, \pi)$, and $d(t) \geq 0$ for any other $t \in \mathbb{C}$.

Zoe cares about the deviation d_z of her choice, but also about others'. More precisely, there is a reference group $G = \{1,.., g,.., n\}$ and Zoe considers what any g *would do if he were in her position*. Further, Zoe compares her deviation with the deviations of the members of G. To formalize this last idea, let $d_g \in [0, 1]$ be g's deviation from the E-norm (according to function d) and d_G some function of vector $[d_1,.., d_g,.., d_n]$, increasing in each d_g. In short, d_G is a measure of the aggregate deviation in G; while other specifications are possible, my applications assume that d_G is the average deviation in G. Note that Zoe might be uncertain about d_G; to make this point clear, I use sometimes the more specific notation $d_G(\omega)$.

To specify Zoe's utility function, let x_z denote her material payoff at outcome $o = t(\omega)$. That is, x_z represents the material utility that Zoe gets from consumption and leisure if o is achieved (or, equivalently, if act t is chosen when state is ω); for simplicity, I take x_z to be equal to Zoe's monetary wealth. Additionally, Zoe also experiences a utility loss or cost $C = \gamma \cdot [1 - d_G(\omega)] \cdot d_z$ if she deviates from the E-norm. Zoe's utility function u: $O \rightarrow \mathbb{R}$ on the set of outcomes takes then the form

$$u[t(\omega)] = x_z - \gamma \cdot [1 - d_G(\omega)] \cdot d_z \qquad (18)$$

Since $d_G(\omega) \in [0, 1]$ by construction, note that $1 - d_G(\omega)$ represents average *compliance* in G. Parameter $\gamma \in \mathbb{R}$ represents how deeply Zoe has internalized the norm.[20] Finally, I postulate that Zoe's preference relation $\gtrsim$ over the set of acts can be represented by a subjective expected utility evaluation $E[u(t)] = \sum_{\omega \in \Omega} u[t(\omega)] \cdot \pi(\omega)$, where π is the probability over the states of Ω.

2.2 Fairness norms and remorse functions

Consider a society, group or set of agents $S = \{1,.., i,.., I\}$; Zoe belongs to S. Further let $x = [x_1,.., x_i,.., x_I]$ denote an allocation of material payoffs in S, where x_i denotes agent i's material/monetary payoff, and X the set of material allocations. A social welfare function (or SWF) W: $X \rightarrow \mathbb{R}$ assigns a number to each material allocation according to its 'social desirability'. While many examples can be considered, let me start mentioning:

$$W^U(x) = \sum_{i \in S} x_i \qquad (19)$$

Let $s(x) = \sum x_i$ denote the social efficiency or surplus of allocation x. If I make the simplifying assumption that agents are risk-neutral, function (19) is a utilitarian SWF, as it increases with the social surplus of allocation x. Thus I refer to SWF (19) as the 'utilitarian' SWF. For another example, suppose that ε: $\mathbb{R}^I \rightarrow \mathbb{R}$ is some measure of how equitable allocation x is. The 'efficiency and equity' SWF is then defined as ($\delta \geq 0$):

$$WE(x, \delta) = s(x) + \delta \cdot \varepsilon(x) \qquad (20)$$

That is, (20) depends positively on the social efficiency of x but also on its equity. Parameter δ indicates how sensitive function (20) is to equity. If $\delta < 1$, for instance, social efficiency is over-weighted relative to equity. If $\delta = 0$, of course, SWF (20) coincides with the utilitarian SWF (19). See López-Pérez (2008, 2010) for additional examples of SWFs.

[20] I will posit that γ is positive, so that Zoe does not want to be a 'rebel', deviating from the norm when others respect it. Note also that the model here extends the model in López-Perez (2008), who assumes a 0-1 deviation function, i.e., any deviation is equally worse. One reason to relax this assumption is that it cannot explain interior solutions in the optimization problem to be analyzed below.

Importantly, Zoe's choice need not only affect her own material payoff x_z but also x_i ($i \in S$). Let $x(t, \omega)$ denote the allocation of material payoffs in S if Zoe chooses t and state is ω. Given any social welfare function W, the expected social welfare of act t is then defined as

$$E[W|\, t] = \sum_{\omega \in \Omega} W[x(t, \omega)] \cdot \pi(\omega) \qquad (21)$$

Definition 3: The fairness norm ψ_W selects in scenario $(\mathbb{C}, \pi)$ the act(s) that maximize the expected social welfare (21). Non-optimal acts constitute deviations.

Intuitively, fairness norms (or norms of distributive justice) are *consequentialist* norms that prescribe actions leading towards a socially desirable or 'fair' outcome. More precisely, any such norm is characterized by a SWF and hence selects those acts that are optimal according to this SWF, i.e., that lead to an allocation that maximizes social welfare. Some remarks follow. First, Definition 3 implicitly assumes that the choice set $\mathbb{C}$ is compact, so that an optimum is well defined. Second, a straightforward example of a fairness norm, associated to SWF (19), is the *utilitarian norm*: 'Do t if you think that t leads towards a socially efficient allocation'. However, the norm that will be pivotal in the posterior analysis is one based on SWF (20) above; this was called before the E-norm. Third, fairness norms allow the introduction of very natural deviation functions (Definition 2). In effect, if act t_ψ respects norm ψ_W in some scenario, rendering an expected social welfare of $E[W|\, t_\psi]$, the difference

$$E[W|\, t\psi] \; - \; E[W|\, t\,] \qquad (22)$$

represents the (expected) decrease in social welfare if Zoe instead chooses t. A deviation function d(t) that positively depends on this difference (a *remorse function* hereafter) hence models the idea that a norm breaker's feelings depend on the 'social damage' caused by her actions.

Fairness norms, it must be noted, are just a particular family of norms. Other examples include non-consequentialist norms as 'follow the law under any circumstances'. In its simplest form, any act expressly forbidden by the law constitutes a deviation from this 'legalistic' norm, whereas any other acts respect the norm. Another is of course Kant's Categorical Imperative – i.e., 'act only according to that maxim whereby you can, at the same time, will that it should become a universal law'. As we will see later, non-consequentialist norms have problems to explain some of my evidence –e.g. subjects donate less if they (i) have negative perceptions about corruption or (ii) hardly support the current president.

2.3. Application: A toy model of tax compliance with norms

Zoe is a taxpayer with initial wealth w_0 and tax liability T[21] and must decide the amount t of taxes that she will pay.[22] The choice set $\mathbb{C}$ is the interval [0, T], so that t = 0 means full evasion. In principle, Zoe has access to public goods financed with taxes and may receive transfers; let $m(\omega, t) \geq 0$ denote the monetary value of the services and transfers enjoyed in state ω if she pays t units in taxes –implicitly, this term depends on the taxes paid by her and other contributors. Further, she can be sanctioned; let $\mu(\omega, t)$ denote the sanction or penalty given choice t and state ω –this includes any potential payment: evaded taxes, fines, interest payments, etc. If Zoe chooses $t \in [0, T]$, therefore, her monetary wealth in state ω is $w_0 - t + m(\omega, t) - \mu(\omega, t)$. To derive predictions, however, I simplify and posit that the marginal effect of each unit of taxes paid by Zoe on the amount of public services enjoyed by her is negligible, so that $m(\omega, t)$ does not vary with t. In addition, I also assume $\mu(\omega, t) = 0$ for any ω and t. These assumptions are not realistic in general but simplify the analysis of tax morale (my focus here) and are plausible in the experiments described later.

Without loss of generality, assume that Zoe has internalized the E-norm and her deviation function takes the form of a remorse function. I also posit for simplicity that taxes have a linear effect on social welfare. That is, each unit of taxes paid increases SWF (19) in Δ units (*net of taxes*). Further, there are just two states of the world. In state 1 (probability π_1), the government is inefficient, and taxes squandered so that Δ takes on a low (possibly negative) value, Δ_1. In state 2, in contrast, the government delivers and $\Delta = \Delta_2 > \Delta_1$. The probability of state 2 is $\pi_2 = 1 - \pi_1$.

To derive predictions, observe first that the E-Norm norm selects act t = T if $E[W^E| t] = (\Delta_1 \cdot \pi_1 + \Delta_2 \cdot \pi_2) > 0$, and act t = 0 if $(\Delta_1 \cdot \pi_1 + \Delta_2 \cdot \pi_2) < 0$ –any choice is normative if the expected effect on the social surplus of any Sol donated is nil. Case $(\Delta_1 \cdot \pi_1 + \Delta_2 \cdot \pi_2) < 0$ corresponds to the case of a 'skeptic' (see chapter 4), and its analysis is direct: Since paying no taxes entails no normative deviation and a nil monetary cost, it is the optimal choice. The most complex case appears therefore when $(\Delta_1 \cdot \pi_1 + \Delta_2 \cdot \pi_2) > 0$. Since the value of difference $W^E [x(t_E), \delta] - W^E [x(t), \delta]$ when the act chosen is t equals $(T - t)(\Delta_1 \cdot \pi_1 + \Delta_2 \cdot \pi_2)$, the remorse function can be represented as $d[(T - t)(\Delta_1 \cdot \pi_1 + \Delta_2 \cdot \pi_2)]$, and Zoe's utility if she chooses t in state ω is:

[21] These variables are equivalent to those of the A-S model such that W is income and w_0 is the taxpayer's initial wealth. Additionally, θW in the A-S model would be the tax liability which is T in this one.

[22] In the A-S model the tax that a taxpayer decides to pay on reported income X is θX which is equivalent to 't' in this model. A point that I leave for further research is whether the tax liability is perceived as fair by Zoe (i.e., in line with her norms), and how these perceptions affect tax compliance.

$$u = w_0 - t + m(\omega) - \gamma \cdot [1 - \mathrm{d_G}(\omega)] \cdot \mathrm{d_z}[(T - t)(\Delta_1\pi_1 + \Delta_2\pi_2)] \qquad (23)$$

Zoe's goal is to choose t so as to maximize the *expectation* of (23). I make two remarks in this respect. On one hand, I simplify and assume that the aggregate deviation $\mathrm{d_G}(\omega)$ gets the same value in the two states of the world; i.e., Zoe is not uncertain in this respect. Further, the remorse function $\mathrm{d_z}$ depends on an expectation and hence takes on the same value in any state of the world. Assuming function $\mathrm{d_z}$ to be twice differentiable, I hence get the following first order condition:

$$\mathrm{d_z'}(\cdot) = \frac{1}{\gamma \cdot (1 - \mathrm{d_G}) \cdot (\Delta_1\pi_1 + \Delta_2\pi_2)} \qquad (24)$$

where $\mathrm{d_z'}(\cdot)$ is the first derivative of the remorse function with respect to the (expected) decrease in social welfare, i.e., $[(T - t)(\Delta_1 \cdot \pi_1 + \Delta_2 \cdot \pi_2)]$. I assume $\mathrm{d_z'}(\cdot) > 0$, which implies that Zoe suffers a higher psychological cost or remorse as t decreases, that is, when she evades more taxes. If I moreover posit that $\mathrm{d_z}$ is strictly convex, so that 'large' deviations from the norm are relatively more painful than 'small' deviations, the second order condition

$$-\gamma \cdot (1 - \mathrm{d_G}) \cdot (\Delta_1\pi_1 + \Delta_2\pi_2)^2 \cdot \mathrm{d_z''}(\cdot) < 0$$

is sufficient for a local maximum, which moreover happens to be an interior solution if I also assume $\mathrm{d_G} < 1$ and $\mathrm{d_z'}(\cdot) = 0$ when t = T. Figure 1 below may help to better understand the determination of the optimum level of tax compliance t*, graphically located where function $\mathrm{d_z'}(\cdot)$ and the horizontal line at level (7) intersect. Note that the critical point about $\mathrm{d_z'}(\cdot)$ is that it decreases as compliance, i.e., choice variable t, increases. The illustrative shape chosen in Figure 1 plays no role in the analysis.

Comparative statics are straightforward from condition (24). Assume for instance that taxpayers have heterogeneous perceptions about the effectiveness of their taxes, that is, about parameters Δ_1, π_1, and Δ_2. Clearly, the value of t satisfying (24) decreases when $\Delta_1 \cdot \pi_1 + \Delta_2 \cdot \pi_2$ decreases. In other words, evasion increases if Δ_1, π_2 or Δ_2 decrease (or π_1 increases) as we can also check with Figure 1 (graphically, the horizontal line moves upwards, thus changing the optimal choice t*). Other things equal, intuitively, tax evasion increases when taxpayers believe that corruption and inefficiency are rampant.

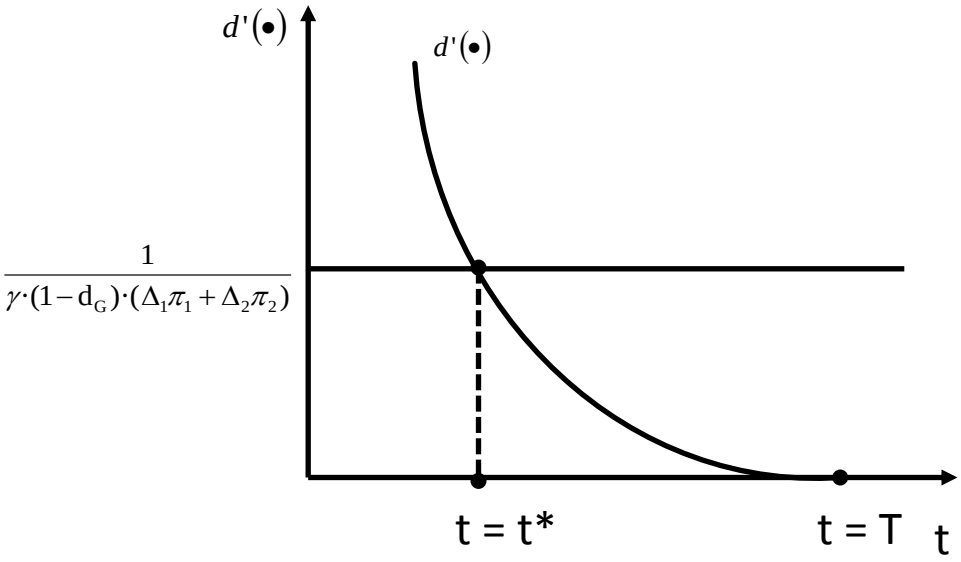

Figure 1: Determination of the optimal level of tax compliance

Chapter 3: Experimental evidence: Years 2016-2017

The experiments considered here have two main goals: (i) Analyzing the determinants of giving to the government, and (ii) testing the model presented in Chapter 2. Although all my experimental treatments have points in common, this chapter focuses on the sessions run during the years 2016 and 2017, for both expositional and methodological purposes. The first section concerns issues relating to design and procedures. I then discuss some predictions of the model in 3.2, whereas 3.3 first presents a brief summary of results and then discusses the empirical relevance of the model. In Section 3.4, I consider donations in an additional treatment. Section 3.5 closes this chapter with a comparison of the model with two alternative utility theories (altruism and reciprocity).

3.1 Experimental design and procedures

I set a very simple, one shot decision problem. Each subject in any session was endowed with 30 Soles (around $US 10) and could voluntarily donate some of this endowment to the Peruvian government (and in one specific session that we will see later on to a well-known non-governmental organization NGO). This donation was implemented by means of an actual bank deposit to an account of the Peruvian Public Treasury (Banco de la Nación account number 00000-299294), made anonymously by two of the experimenters after all participants have finished their choices (with two subjects acting as witnesses). Any subject's payoff equals the initial endowment minus the donation, plus a 20 soles (around $US 7) show-up fee.

Each session was conducted as follows. Before it started, the instructions and a decision sheet were distributed in conveniently separated seats across the room so as to avoid communication between subjects. Then every subject entered the room and chose one of those seats. They first read the instructions at their own pace; subsequently, the experimenter read them aloud to ensure common knowledge.[23] Questions were privately clarified. All decisions were taken with pencil and paper. Any subject was identified by an individual ID number, included in her/his decision sheet.

Instructions attempted to diminish potential demand effects or other confounds. For instance, I used neutral language and stated that there were no tricky questions, so that subjects

[23] The translated instructions, decision forms and questionnaires can be found in Appendix I.

should choose as they preferred. A potential motivation by any subject to behave so as to 'please' the experimenters, therefore, arguably put no constraints on her choice. The instructions also recalled that the Peruvian government offers different public services, collecting taxes to finance them. In this respect, the experimenter noted verbally, while reading aloud the instructions, that the subject's donation would be used by the Public Treasury to finance similar expenditures as those taxes do; subjects were also informed in this manner about the Banco de la Nación account number mentioned above, writing as well that number in a blackboard.

When subjects had decided on their donation, decision sheets were collected and an elicitation sheet given. Here I elicited some beliefs that were designed so as to test several predictions, to be presented in detail in the following. Two of these beliefs are particularly relevant. First, I asked each subject to estimate the average donation among all participants in the session. Second, I also elicited beliefs about the position of Peru in the 2015 corruption index by Transparency International. After all subjects had their beliefs elicited, I collected the corresponding sheet. Then subjects answered a brief questionnaire on socio-demographics, frequency of use of public services, support to the current presidential team, concern for inequity, etc.; many of these questions appear in similar terms in the World Values Survey (www.worldvaluessurvey.org). The experiment ended with the completion of this questionnaire. Subjects were then paid in private by an assistant who was not informed about the details of the experiment.

Anonymity was guaranteed since any sheet was identified only by the corresponding subject's ID number, thus containing no personal information. Additionally, to further subjects' confidence in my procedures, they were told that at the end of the experiment two subjects would be asked to volunteer as witnesses. After all subjects had been paid, these witnesses checked the decision sheets and recorded the sum of all individual donations. Afterwards, the experimenters and the witnesses went to the bank office situated in the commercial center in front of the University campus, where an anonymous deposit was made for the total amount donated.

I run two sessions (1 and 2) at Universidad de Lima in 2016 and 2017, with 60 and 50 participants in each, respectively. Subjects were between 25 and 55 years old and economically active. In Session 1 in 2016, they were selected by IMASEN following precise instructions,[24] so that the random sample was representative of the taxpayer population of Metropolitan Lima

[24] IMASEN is a Peruvian research-based consulting company, well-known for its market studies, surveys and polls: http://www.imasenperu.com/

regarding age, gender, and socio-economic conditions. University of Lima's market research department selected with a similar methodology the participants for Session 2, run approximately one year later than Session 1 (the gap allows me to check the robustness of the model). In any case, recruiters did not disclose any detail about the experiment to the subjects, except that this was a "focus group" meeting to collect opinions about government, institutions and other social issues. In all cases, each session lasted approximately 90 minutes, including paying the subjects individually. The average payoff in Sessions 1 and 2 was 45.33 Soles and 46.86 Soles, respectively, including always the mentioned show-up fee of 20 soles.

Aside from the control treatment described above, the NGO Treatment included other 60 subjects (selected by IMASEN again; this experiment was run approximately at the same time as Session 1 of Control). This NGO treatment was identical to the Control except that the donation was not made to the Public Treasury but to the "Liga contra el Cancer" ("League against Cancer"), a private NGO that helps cancer patients all around Peru.[25] The average payoff for the participants in NGO was 46.78 Soles. The deposit of 193 Soles was made in the Banco de Crédito del Perú account number 193-110188-0-80. In addition, a third treatment called INFO consisted of a slight variation of Control, as I included in the decision form the rounded average donation made by the participants in Session 1 of Control. This INFO treatment was run at the same time as Session 2 of Control. The 54 participants in INFO earned in average a total payoff of 45.30 Soles. Let us note that no subject attended more than one session or treatment.

It must be noted as well that the questionnaire in INFO and Session 2 of Control was a variation of the one used during 2016 in Session 1 of Control and the NGO treatment, as I added several questions to elicit subjects' beliefs about the eventual donations of members of some of their daily-life reference groups e.g. family, co-workers, classmates, neighbors, close friends and even members of the same church if applicable. Further, a new question referred to the percentage of the public budget that the subject estimated to end up wasted or in corrupt hands. On the other hand, I omitted some questions that appeared in the 2016 questionnaire because subjects had apparently problems to fully understand them. In Part 2 (see the appendix), more precisely, I removed questions 1 to 5 (beliefs about other participants' donations, grouped in intervals from zero to 5, 6 to 10 and so on), question 6 about the number of participants expected to have donated less, equal or more than the respondent, and question 7 about the total donation by all participants in the session –many answers exceeded the maximum possible aggregate

[25] The League was founded in 1950. It has received important awards and prizes in Peru and Latin America as recognition of its accomplishments; see http://www.ligacancer.org.pe/reconocimientos.html.

donation, i.e., 30 soles multiplied by the number of participants in the session. I also removed question 13 on the percentage of the national budget assigned to social programs, infrastructure and salaries of public employees, as many subjects gave answers such that the sum of them exceeded the 100%. In part 3, I removed question 2 in which I mentioned several hypothetical income distributions and asked the subjects' preference ordering for those distributions in order to capture their preferences for equity, and question 3 which elicited beliefs about Peru's current income distribution. One problem here was that many of the orderings reported in question 2 did not comply the expected transitivity so I decided not to use them. Finally, I also removed question 4 on trust: "Would you say that it is advisable to trust people under any circumstances?"

3.2 Applying the model

As we can recall, Zoe's utility function (23) takes the following form:

$$u = w_0 - t + m(\omega) - \gamma \cdot [1 - \mathrm{d_G}(\omega)] \cdot \mathrm{d_z}[(T - t)(\Delta_1 \pi_1 + \Delta_2 \pi_2)]$$

Zoe has some initial wealth and tax liability, and must decide the optimal amount of taxes t, i.e., how much of her money she will give to the government. This maximization problem was formally explored in Chapter 2 and now I stress that such decision problem resembles the experiment, in that subjects choose how much of their endowment they donate to the government. Contrary to a real tax evasion problem, of course, subjects in this experiment have no law indicating what they should give to the government, and cannot be sanctioned for giving zero. But this is in fact what allows me to cleanly analyze how consequentialist norms motivate (some) people to give money to the government (the focus here), without any confounds due to potential sanctions or non-consequentialist, legalistic norms.

According to the theory, an agent's choice depends on three factors (here called 1, 2 and 3). **Factor 1** is the most straightforward one, i.e., the degree γ of internalization of the E-norm. In the limit, if all subjects had $= 0$, all of them would be standard selfish maximizers and hence give zero Soles.

Factor 2 is more subtle and refers to the subject's belief about the damage caused by her action, i.e., $\mathrm{d_z}(t) \in [0, 1]$. As noted in 2.3, subjects can be heterogeneous in this respect. The key is whether they expect donations to be used competently by the government, i.e., to promote social efficiency and equity; see equation 21. Those subjects who highly distrust the public sector will think that the money is better in their purses, and that non-donating is in fact the 'fair' choice according to the E-norm, hence causing no damage; this is the case when $(\Delta_1 \cdot \pi_1 + \Delta_2 \cdot \pi_2) < 0$. In contrast, another group of subjects expect the government to be sufficiently

competent; this means $(\Delta_1 \cdot \pi_1 + \Delta_2 \cdot \pi_2) > 0$, so that the E-norm then recommends giving the whole endowment. In what follows, I refer to the first group of subjects as (government) 'skeptics', and the second as 'believers'.

The skeptics' optimal choice is straightforward: Since the E-norm recommends them not giving money, and such choice moreover maximizes their material payoff, they give nothing. In contrast, the believers face a trade-off between their material payoff and the damage caused if they deviate from the norm, that is, give less than 30 Soles. If the social damage is expected to be sufficiently low, a believer will give zero. Otherwise she will donate something, perhaps the whole endowment –given convenient convexity assumptions, furthermore, a believer's utility maximization problem has an interior solution (see Figure 1).

Factor 3 is a subject's beliefs about others' choices, or more precisely about how 'bad' or damaging others' choices are. Note that there is a non-trivial question in this respect: Who are a subject's referents? That is, to whom does she compare with? I first posit that participants in an experiment compare with other participants; later on, however, I will propose other groups. In any case, I predict that a non-selfish subject's donation depends on her beliefs about d_G.

More precisely, I distinguish two cases. On one hand, the skeptics believe that donating zero is the normative, non-damaging option –they perceive donations as a waste of money. If we assume utility function (23), therefore, these subjects should be unaffected by their beliefs. For the believers, on the other hand, the social norm prescribes a full donation, which implies that giving less is perceived as damaging. As with Factor 2, therefore, the decision whether to comply with the norm or deviate partly or totally will depend on the subject's beliefs, in this case about the average donation $1\text{-}d_G$.

My discussion on Factors 2 and 3 leads us to distinguish two groups of *believers*: Pessimists and optimists. Although both have larger confidence in the public sector than the skeptics and hence consider that the normative choice is a full donation, the pessimists feel that the average donation by others ($1\text{-}d_G$) is relatively low and hence feel little remorse for not giving. In contrast, the optimists either conclude that the damage for not giving is relatively high or expect others to give more substantial amounts (i.e., high $1\text{-}d_G$). Ceteris paribus, therefore, they suffer a higher utility cost for not giving and thus choose a relatively high donation; in fact, of the whole endowment if the marginal cost is sufficiently high for any level of deviation. Table 2 summarizes the discussion so far.

Classification of agents			Predicted donation (D)	Cause
Selfish			D = 0	$\gamma = 0$
Non-selfish	Skeptics		D = 0	$\gamma > 0$, but very negative expectations about how competent the government is ($\Delta_1 \cdot \pi_1 + \Delta_2 \cdot \pi_2 < 0$); the E-norm then selects D = 0.
	Believers	Pessimists	D = 0	$\gamma > 0$. The E-norm selects D = 30 Soles since $\Delta_1 \cdot \pi_1 + \Delta_2 \cdot \pi_2 > 0$. Yet relatively negative expectations about how competent the government is or about others' donation choices. That is, either $\Delta_1 \cdot \pi_1 + \Delta_2 \cdot \pi_2$ or $1\text{-}d_G$ (or both) are relatively low.
		Optimists	D > 0	$\gamma > 0$. The E-norm selects D = 30 Soles since $\Delta_1 \cdot \pi_1 + \Delta_2 \cdot \pi_2 > 0$. Further, relatively positive expectations about how competent the government is or about others' donation choices. Precise donation level depends on γ and how positive these beliefs are.

Table 2: Summary of behavioral predictions

3.3 Results analysis

Summary

Table 3 presents some descriptive data regarding the distribution of donations in each treatment and session of 2016 and 2017. We observe the highest average donations in Session 1 of Control and the INFO treatment, whereas the lowest are found in the NGO treatment and Session 2 of Control. We also find differences across sessions/treatments in the distribution of donations. For instance, the fraction of subjects who donate less than 5 Soles is above 60% in NGO and Session 2 of Control, but below 40% in INFO and Session 1 of Control.

The average subject (N = 224) for all treatments (i) was around 40 years-old, slightly oriented to the right side in politics (5.63 out of 10), and more religious than the half line (5.3 out of 10). Further, she tends to distrust others (in a scale from 0 to 10, 0 being the minimum, average trust is 3.19), believes that Peru is a rather corrupt country (position 126 out of the 168 countries analyzed in 2015), and thinks that personal income depends more on personal effort than luck or influences: If 0 (10) means that income depends on luck (effort), the average subject evaluates in 7.49 the relative importance of both factors. She also believes that the Peruvian

government mostly pursues individual and selfish interests instead of working for the people (3.36 in a scale from 0 to 10, 0 being the most pessimistic opinion).

Treatments and Sessions		Number of Subjects	Average Donation	Standard Deviation	Subjects by interval of donation (% in parentheses)				
					0	[1,4]	[5,9]	[10,15]	[16,30]
NGO		60	3.22	2.92	13 (21.7)	25 (41.7)	18 (30.0)	4 (6.7)	0 (0.0)
Control	Session 1	60	4.67	4.67	10 (16.7)	20 (33.3)	18 (30.0)	10 (16.7)	2 (3.3)
	Session 2	50	3.14	5.94	23 (46.0)	13 (26.0)	10 (20.0)	1 (2.0)	3 (6.0)
INFO		54	4.7	4.66	9 (16.7)	12 (22.2)	25 (46.3)	7 (13.0)	1 (1.9)
Control + INFO		164	4.21	5.1	42 (25.6)	45 (27.4)	53 (32.3)	18 (11.0)	6 (3.7)
All treatments and sessions		224	3.95	4.64	55 (24.6)	70 (31.3)	71 (31.7)	22 (9.8)	6 (2.7)

Table 3: Descriptive statistics of each treatment and session

Determinants of donations to government

Note that the standard neoclassical model is a special case of the model presented in Chapter 2, where Zoe has $\gamma = 0$. That is, a selfish Zoe only cares about her own wealth, suffering no psychological cost. Similarly, if a participant in this experiment cares *only* about the legalistic norm described in 2.2, then she suffers no cost whatever she does (obviously, the law does not forbid a zero donation). The following result is hence immediate:

Hypothesis 1: If all subjects are selfish or have internalized the legalistic norm, nobody donates anything in any treatment.

Evidence: As Table 3 above indicates, 42 subjects donate nothing to the government (around 26%) and 13 to the NGO (22%). The fact that most subjects do not act as the standard model predicts suggests the existence of tax morale. Indeed, a Wilcoxon signed-rank test indicates that the donation to the NGO is statistically significant (p-value > 0.0001; for more detail see Test 1 in Appendix II), and the same is true for the donation to the government in Control (sessions 1 and 2 pooled; p-value > 0.00001; see Test 2 in the appendix) and INFO (p-value > 0.00001; Test 3). In summary, I reject Hypothesis 1.

The conclusion is straightforward: People give money to the government even if no formal law prescribes so and no sanctions are expected for not giving. Since the evidence strongly suggests that not all subjects are selfish, I consider alternative motivations for giving. A priori, natural candidates are several utility theories of other-regarding preferences. Models of inequity aversion like Fehr and Schmidt (1999), for instance, predict that some individuals

may sacrifice part of their material payoff to reduce differences in monetary gains between themselves and other individuals. However, Fehr and Schmidt (1999) cannot explain donations in any treatment, as donating only increases the disadvantageous inequity with those subjects who do not donate.[26] For another model, Dufwenberg and Gneezy (2000); Battigalli and Dufwenberg (2007) assume that people suffer a utility cost if they believe they have let down the payoff expectations of another. Yet this hypothesis of belief-based guilt-aversion cannot explain either any donations because, arguably, donations are totally unexpected by the receptor (the government or the NGO).

Potentially more promising approaches are reciprocity models like Rabin (1993) and (unconditional) altruism and warm-glow as in Andreoni et. al. (1998), which I will discuss later in more detail. For the moment, however, let us focus on the model presented in Chapter 2 and again, concretely, in function (23). Since giving money in the experiment reduces the subject's wealth, it must be the psychological cost what induces them to give. Now, Section 3.2 explained that this cost depends on three factors. To organize the exposition, I will consider each one separately, starting with Factor 2

Recall that the crucial issue here was determining the E-norm prescription, conditional on the subject's expectations. If the government is expected to use the money in an efficient manner, the E-norm says that all the endowment should be given. If on the contrary the government is perceived as corrupt or wasteful, the norm recommends keeping the money in the subject's pockets. As I explained, this allows to distinguish between 'skeptics', who have no normative reason to give in this experiment, and hence will give nothing ($\Delta_1 \cdot \pi_1 + \Delta_2 \cdot \pi_2 < 0$), and 'believers' who show relatively more positive expectations ($\Delta_1 \cdot \pi_1 + \Delta_2 \cdot \pi_2 > 0$), and hence can give something. How much do these believers exactly give? Suppose that subjects have heterogeneous expectations regarding the likelihood that the government is efficient (i.e., probabilities π_1 and π_2). In this case they will also differ in their perceptions about how damaging not giving is. Since the cost of breaking the norm depends on the magnitude of the subject's deviation, which in turn depends on the 'damage' caused, believers will give more the more optimistic they are regarding π_2, the probability of an efficient government. In conclusion, the model implies a non-linear relation between a subject's expectation and her donation: Skeptics give nothing, and believers give more the more optimistic they are about the government's performance.

[26] More formally, the experimental decision problem here has the payoff structure of a VCM public good game with a marginal per capita return of the public good equal to zero. Proposition 4 in Fehr and Schmidt (1999) then implies no donations.

Hypothesis 2: A subject's decision to donate to the government indirectly (but non-linearly) depends on her perceptions about the level of waste, incompetence, and corruption in the public sector. The amount donated analogously depends on these variables.

Evidence: The answers to several items in the questionnaire should be correlated with these perceptions; most obviously, the belief about Peru's position in the Transparency International ranking. Other things equal, I indeed expect a non-linear negative correlation between that belief and the amount donated to the Peruvian government. On the other hand, I expect a positive, non-linear relation between the subject' s donation and her/his support to the current presidential team, as it is plausible that most people who sympathize with a president and her/his ministers tend to believe that they are relatively competent. In the questionnaire, finally, subjects were also asked their agreement with the following two statements: (i) The Peruvian government is controlled by a few interests who are only concerned with themselves, and (ii) the Peruvian government governs for the benefit of all. Answers were numerical, from 0 (complete agreement with the first statement) to 10 (indicating complete agreement with the second one). This question, while possibly highly collinear with the corruption question, can be used as a further robustness test of my model. I predict a positive relation between the subject's answer and her/his donation.

To check these predictions, I conduct a regression analysis, pooling the data from Control and INFO. Models 1 and 2 in Table 4 are *linear* OLS models where the dependent variable is a subject's donation to the Government, in Soles, provided that it is strictly positive. Hence, these models study the determinants of the donation among those subjects who donate something, assuming a linear relation. Model 1 includes several key variables, and in particular those related to Hypothesis 2 (variables 1 to 3 in the left-hand column). Model 2 adds some other variables collected in the experiment.[27] In these models, we observe that the coefficients of the variables (1) corruption and (2) support to current president have the expected sign (negative and positive, respectively). Only the second variable is however significant. Variable 3, measuring trust in the government, has not the expected sign and is never significant. In turn, Model 3 is a logistic regression where the dependent variable is a dummy taking value 1 if the subject donates zero. We observe that such decision is not correlated with Variables 1 to 3; a

[27] I do not report the whole analysis here, as models (2) and (4) also control for the subject's age, gender, general trust on others (0: never, 10: always), perceptions about the government's performance in the last 5 years (0: Lousy, 10: Excellent), willingness to pay more taxes if government improves public services (0: No, 1: Yes), car ownership (no:0, yes:1), and whether he/she has children (0: No, 1: Yes). Neither of these variables is significant in any model (not even marginally).

potential reason is that some significant share of the subjects who donate zero are selfish agents, for whom my model predicts no correlation between these variables and their choice.

Dependent variable	Donation (D) > 0		Dummy D = 0	Log (D + 1)	D
Independent variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**
1. Corruption (1: least - 168: most)	-0.0062	-0.0089	0.0037	-0.00341**	-0.001
	(0.011)	(0.011)	(0.004)	(0.002)	(0.005)
2. Support to current president (0: not at all, 10: entirely)	0.5505***	0.3378*	-0.0591	0.0556*	0.378***
	(0.163)	(0.2004)	(0.0699)	(0.029)	(0.104)
3. Government is controlled by (0: few interests, 10: works only for the people)	-0.1924	-0.1179	-0.0721	0.0162	0.036
	(0.189)	(0.216)	(0.089)	(0.034)	(0.127)
4. belief average donation others	0.1905***	0.214***	-0.1394***	0.0461***	0.201***
	(0.063)	(0.067)	(0.047)	(0.01)	(0.045)
5. Weekly frequency of watching news (in tv, internet, and others)		-1.352**		-0.137	-1.085***
		(0.584)		(0.085)	(0.407)
6. Political preferences (0: extreme left, 10: extreme right)		0.248		0.046	
		(0.279)		(0.042)	
7. Education		-0.412		0.038	
		(0.597)		(0.084)	
8. Socio-economic level		0.881		-0.026	
		(0.655)		(0.095)	
Intercept	2.498	4.297	-0.197	0.787	5.141***
	(1.928)	(4.298)	(0.901)	(0.681)	(1.49)
Obs.	122	120	163	160	164
R-square	0.103	0.143	0.109	0.252	0.191

Note: Robust standard errors in parentheses. All models except 3 are estimated by OLS. The median dummy model 5 uses the medians of the variables to generate binary variables (if variable < median, then dummy = 0, whereas dummy = 1 otherwise). Models 1, 2 and 5 do not satisfy homocedasticity, while Model 4 does. Model 3 is estimated by a logistic regression, where the dependent variable is donation (nil donations take value 1, otherwise 0). ***, **, and * indicate significance at 1%, 5 %, and 10% levels, respectively.

Table 4: Regression analysis of determinants of donation to government

None of the models in Table 4 seem to present multicollinearity problems, based on the analysis of variance inflation factors (VIF) –the mean VIF is never larger than 1.33; see Test 4 in Appendix II. In Models 1 and 2, however, I reject the null hypothesis of constant variance of errors then questioning linearity (Breusch-Pagan test, p-value < 0.0001; Test 5). Since my theory also predicts a non-linear relation between these variables and the donation, I hence run regression Model 4. This is a non-linear model where the dependent variable is D* = Ln(D+1), D being the subject's actual donation to the government. In short, I assume an exponential relation between the donation and each explanatory variable.

Hence any estimated coefficient can be interpreted as a growth rate, i.e., if the coefficient of X equals β, the donation changes at a rate of $100 \cdot \beta\%$ as X marginally increases. In this model,

Variables 1 to 3 all have the hypothesized sign. Moreover, the first and second variables (corruption and support for current president) are significant in both models (either at 5% or 10% levels).[28] Variable 3 is never statistically significant, possibly indicating that its net effect is not relevant once variables 1 and 2 are taken into account.

While I postpone for the moment the discussion on variable 4 (beliefs about the average donation of others), I make a brief comment on the other variables that appear in Models 2 and 4. First of all, I find that political ideology (variable 6) and education (variable 7) have no significant effect on the donation in the model. In turn, the socio-economic level (variable 8) is a variable constructed by the Peruvian Market Research Firms' Association (APEIM) that depends on the subject's income but also on her/his neighborhood of residence, the number of vehicles that he/she owns, the education level, having a (private) health insurance, and other characteristics.[29] It seems a fairly good approximation to the level of wealth and income of the subject's household, and I find it not to be correlated with the amount donated in the years 2016-17 (in fact, other variables that I elicited to measure wealth are also non-significant in my sample; later I will qualify this point, though). Finally, I find that a subject's weekly frequency of watching the news (see appendix I for the exact wording of the question) *negatively* correlates with the donation in some regressions: More informed subjects donate less. Hence it seems that some factors not considered by my model might play an explanatory role; I leave them for future research.[30]

I have also considered an alternative non-linear model, where D is the dependent variable. For any explanatory variable X, moreover, I assume a nil effect until X reaches some threshold X*. From that point on I hypothesize a significant linear relationship between D and X, as Figure 2 below indicates for an increasing case.

[28] I note that both variables become marginally significant when I control for religiosity and the size of the subject's home (in square meters). A problem here however is that I lose around 50 observations, as many subjects did not respond at least one of these questions.

[29] This variable takes five possible values (A, B, C, D and E), A being the highest; for more methodological details, see http://www.apeim.com.pe/wp-content/themes/apeim/docs/nse/APEIM-NSE-2016.pdf. Our recruiters chose our sample of participants so that it was representative of the taxpayers' population also with respect to this variable.

[30] Incidentally, Peruvian media have been often criticized for lack of rigor and average low quality; see Wood (2000) and Alonso (2016).

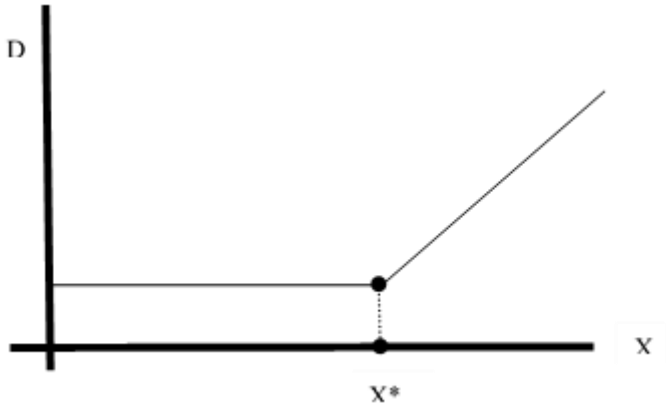

Figure 2: A non-linear relation between donation and X

While many potential values for threshold X* can be considered, I find that a possibly natural one is the median m(X) of the distribution of X for all subjects in Control and INFO. If only one variable X were considered, formally, the model would be therefore of the type:

$$D_i = \alpha + \beta \cdot Z_{Xi} \cdot X_i$$

Where D_i is subject's i donation, X_i is the value that variable X takes for subject i (e.g., her/his perceived ranking of Peru in the Transparency International Index), Z_{Xi} is a dummy variable taking value zero if X_i is lower than m(X), and value one otherwise, and α and β are the coefficients to be estimated. As we see in Model 5 of Table 4, variables 1 to 3 have the hypothesized sign, but only support for the president is significant. Additionally, variable 5 (frequency of watching the news) is highly significant showing a strong, non-linear and negative relationship with donations; it appears that from a certain value, i.e. the median, subjects tend to estimate that public policies and services fail to accomplish their expectations. I overall interpret the evidence in Table 4 as not rejecting Hypothesis 2 but suggesting a complex non-linear relation between donations and perceptions. The following result summarizes the discussion so far.

Result 1: Donations depend non-linearly on the subject's perceptions about the competency of the government. That is, among those subjects who have more positive perceptions in this respect, donations increase as perceptions improve. In contrast, donations are not explained by the subject's age, gender, religiosity, political ideology, wealth, and education level.

I make two remarks. *First,* in the process of writing this thesis I have received the comment that the correlation between beliefs and donations might be due to reverse causation: Subjects adjust their beliefs in response to the amount they have just given to avoid cognitive dissonance. For instance, a subject who donates x Soles and is later asked about her support to

the president, might feel uncomfortable if she states a very low support. To prevent this feeling, she might state a higher support. In my opinion, however, the premises of my model are somehow implicit in this argument. In effect, if the subject feels dissonant when she gives *and* has a bad opinion of the government, does not this mean that she considers this opinion a relevant conditional of choice? In other words, if the subject finds uneasy by giving money to an incompetent government, this seems a signal that perceptions affect donations.[31] *Second*, the differences in the average donation between Sessions 1 and 2 of Control, which were run approximately with one year of difference, can be explained *in part* by my model. In effect, I have shown before that support for the current president is a significant explanatory variable, and this variable has a significantly lower median value in Session 2 (median support in Sessions 1 and 2 was 7 and 5, respectively; Mann-Whitney, $p > 0.0213$; Test 6), possibly reflecting the fall in popular support that president Kuczynski's government suffered during his first year of mandate (note that Session 1 was run shortly afterwards the president was elected).[32] Yet I also note that there seems to be some idiosyncratic effect in Session 2: If I include two dummy variables in Model 4 of Table 4 above, one for the INFO treatment and another for Session 2, we observe that the last dummy is negative and significant at the 1% level.[33]

I turn now to another goal of my study, which is to explore peer effects, or more precisely Factor 3 of section 3.2. My starting hypothesis is that subjects compare with each other, so that a subject's reference group contains all the other participants in the session. In this case, the average donation appears to be a natural benchmark.

Hypothesis 3: The amount donated directly depends on the subject's belief about the average donation from others.

Evidence: As we can see in Table 4, this hypothesis is largely vindicated by the data. In effect, the estimated coefficients for this variable are positive in all regressions and moreover significant at 1% level. For further illustration, Figure 3 below includes graphs for Session 1, Session 2 and the INFO treatment. In each graph, a dot corresponds to a participant in the corresponding session/treatment, located according to her/his beliefs and donation to the

[31] I do not exclude however the possibility that cognitive dissonance might have reinforced the *strength* of the correlations. Further research is warranted.

[32] His support at the time of Session 1 in November 2016 was 51% but decreased to 27% by the time of Session 2 in November 2017 (source: IPSOS Market Research). By March 21st, 2018 President Kuczynski resigned his presidency after being involved in a vote-buying scandal.

[33] The INFO dummy is non-significant. In comparison to Model 4 in Table 4, further, the level of significance of the other explanatory variables remains unchanged in this expanded model. Detailed results are available upon request.

government (vertical axis). We can observe in the three graphs a regression line, showing that beliefs and donations positively correlate in all sessions and treatments considered. The reader can also possibly perceive that such correlation is far from perfect. In fact, donations are often smaller than beliefs. Indeed, the coefficients of Models 1 and 2 in Table 4 above indicate that an increase in the beliefs in one unit leads to an increase in the donation of around 0.20 Soles, which is significantly smaller than 1 (with such a null hypothesis, the p-value happens to be 1).

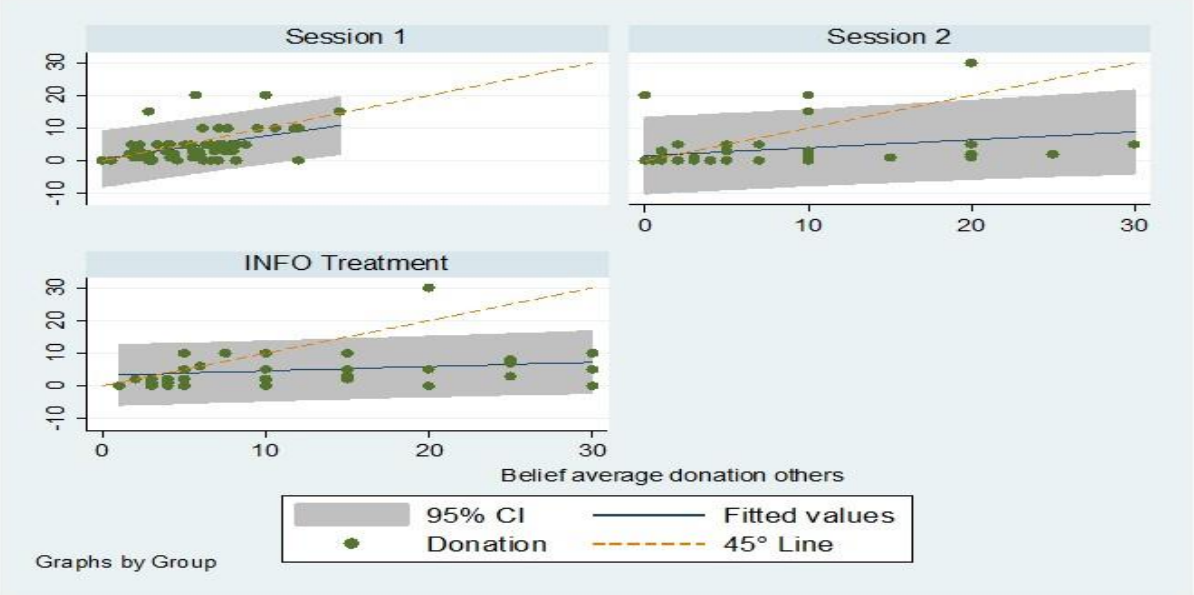

Figure 3: The relation between donations and beliefs

A problem in the previous analysis is that the correlation between beliefs and donations can be spurious. A potential reason is the so-called false consensus effect, which captures the tendency of an individual to think that others are similar to her –Ross et al. (1977), Marks and Miller (1987). That is, donations might not be affected at all by the subject's beliefs and yet be co-linear with them, just because people tend to think that others are like themselves and hence donate similar amounts. For a number of reasons, I believe that these results are not driven by the false consensus (at least entirely). To start, I recall that donations are systematically lower than beliefs (see Figure 3 above): Subjects tend to believe that others give more. In addition, the results from the INFO treatment, which I conducted to explore further whether beliefs affect donations, are at odds with the idea that beliefs are irrelevant for choice. Recall that subjects in INFO were informed in the donation sheet –that is, before choosing– about the (rounded) average donation to the government in Session 1 of Control, i.e., 5 Soles (the actual average was of 4.67 Soles).

The rationale behind this treatment is twofold. On one hand, the *distribution* of donations in INFO and Control should not be statistically different if beliefs are *inconsequential*

for behavior, other things equal. Note that the last proviso indicates that some caution must be taken when comparing data from both treatments. For instance, Session 1 of Control and the INFO session were run with a year of difference, and a significant variable like the support for the president changed during that time. Hence, the proper comparison is that between Session 2 of Control and the INFO session, as both were run at a similar time. In this respect, a two-sample Kolmogorov-Smirnov test indicates that the two donation distributions are statistically different ($p > 0.001$; see Test 7 in Appendix II). This is therefore evidence that beliefs do affect behavior.

In this vein, a second rationale for the INFO treatment is that my model predicts a specific change in the distributions across treatments, at least under certain ancillary assumptions. In effect, suppose that a significant fraction of subjects in INFO use the average donation in Session 1 of Control as the reference point, and not the average donation by other subjects in INFO.[34] In this case, many subjects in INFO would have the same reference point. In Session 2, in contrast, I suppose that subjects compare with each other; in principle, reference beliefs should be more heterogeneous. Since reference beliefs affect donations by assumption and they are more heterogeneous in Session 2, a contraction of the distribution of donations is expected in INFO ceteris paribus. When I compare this distribution in INFO and Session 2, in fact, a Levene's test for differences in variances indicates a lower dispersion in INFO ($p > 0.0432$; see Test 8 in Appendix II).

Note well that I predict a difference in the dispersion, but not *necessarily* in the median or average donation. Although the average donation in Session 2 happened to be smaller than that in INFO, other results were theoretically possible –e.g., if subjects in Session 2 had beliefs systematically higher than 5, they would give more.[35] Yet I can say something when comparing Session 1 and INFO: *If subjects in INFO tend to move towards a donation of 5 Soles*, the average donation in INFO and Session 1 of Control should be similar. In this respect, I note that the median donation in INFO is indeed not significantly different than that in Session 1 (Mann-Whitney k-sample test; $p > 0.6202$, see Test 9). Since this result follows from the italicized

[34] In this account, the reference group G is not fixed, but shaped by the context: Zoe does not always compare with the same people, but with those who happen to be salient (see Gino et al., 2009, for a similar idea and evidence). Alternatively, I could assume that subjects in INFO compare among themselves, but that their expectations are influenced by the information provided, so that they tend to believe that others donate in average an amount similar to that in Control, Session 1. As I report later, however, this latter idea seems in contradiction with the data on beliefs.

[35] The discussion thus stresses that peer effects may operate through other statistics than the median or the mean. This is perhaps related to the results by Del Carpio (2014) in a field experiment on property tax collection in Peru. She sent letters to taxpayers (a) including only payment reminders, and (b) containing as well information about previous peer compliance, and found a small and statistically insignificant increase in tax compliance in condition (b).

assumption just cited, which in turn is implied only by some specific parameterizations of my model, I view it as less relevant though than the dispersion result in the previous paragraph.

In summary, the core of my argument is that the reference point in INFO is fixed (at least for a substantial share of subjects), whereas subjects in Control do not have such fixed reference.[36] The effect on dispersion follows. A subtle, although collateral, point in this respect is whether subjects in INFO anticipate this phenomenon, that is, do people anticipate peer effects? The answer seems to be negative, which is somehow paradoxical: Behavior is apparently shaped by the fixed reference point, but then subjects fail to capture this treatment effect.

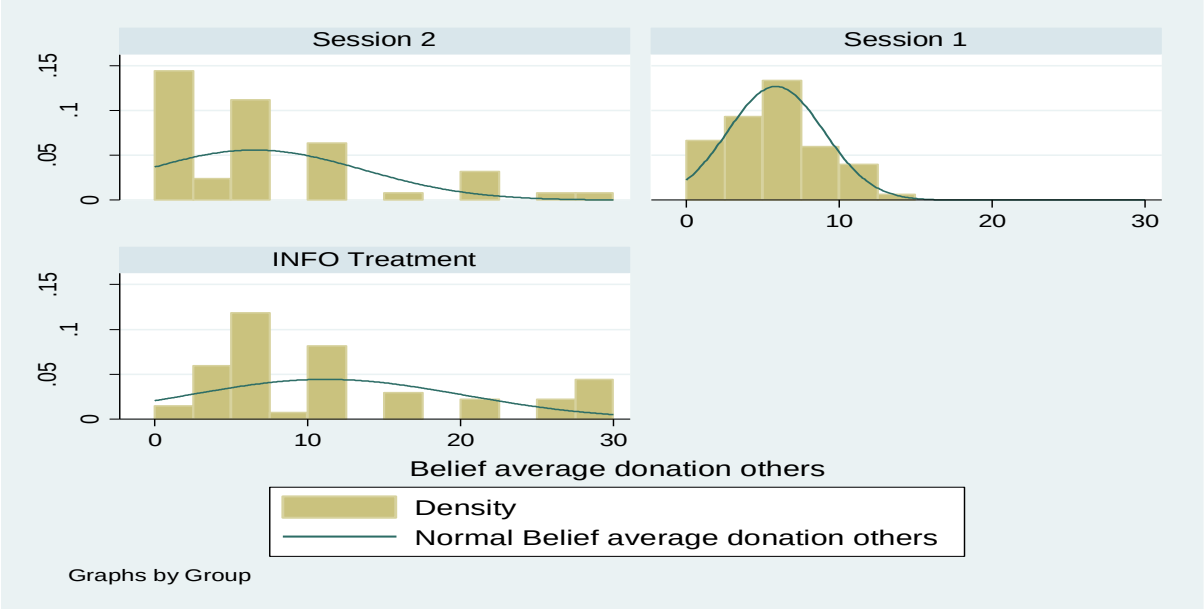

Figure 4: Distribution of beliefs about average donation to government

To illustrate the point, Figure 4 above depicts the distribution of beliefs about the average donation to the government in each session and treatment. If many participants in INFO anticipated the effects, the distribution of beliefs would be less dispersed than in Session 2, with a mean around 5 Soles. To the contrary, I find that the standard deviation equals 7.13 in Session 2 but equals 9 in INFO; the difference is marginally significant according to Levene's test (p-value = 0.0504; see Test 10). In Session 2, further, the average and median belief equals 6.49 and 5, respectively, while they respectively amount to 11.18 and 9 in INFO, again a marginally significant difference (p = 0.068; see Test 11). I yet stress that the subjects' failure to anticipate

[36] Playing again devil's advocate, one could insist that beliefs do not shape behavior, arguing instead that the 5 Soles reference in INFO acts as an anchor (Tversky and Kahneman, 1974). Anchoring occurs when someone who has to estimate an unknown quantity observes a number, to the effect that the posterior estimation orbits around that number. However, what estimation could be shaped by the 5 Soles reference, other than that of some reference belief, irrelevant by assumption in this argument?

the peer effects does not invalidate from my point of view the argument about the existence of such effects: A person can be affected by the reference point and yet believe that others are not. Even more, the effect of such reference on her decision might be somehow unconscious to her.

Result 2 (peer effects): Donations co-move with beliefs about the average donation in the reference group, and the relation is highly significant. Beliefs seem to play a causal role because the distribution of donations changes if subjects tend to have homogeneous reference beliefs, as arguably occurs in INFO. As hypothesized, less dispersion is observed in the donations when subjects have a common reference belief. Further, the average donation seems to be shaped by that reference point. Subjects apparently do not anticipate peer effects.

On a different topic, Factor 1 (see 3.2) predicts that those subjects who have strongly internalized the norm should donate more, other things equal. In order to test this prediction, I could have asked subjects what they consider normative in the donation decision, or some similar question. I was afraid, however, that their responses could be biased, possibly in a self-serving manner. Therefore, I have used a more indirect alternative. In effect, the post-decision questionnaire in INFO and Session 2 included questions about the hypothetical average donation of relatives, co-workers, university or college partners, close friends and neighbors if they had chosen in the donation decision.[37] Now, it can be argued that social norms are partly internalized during infancy and adolescence within the family, and that people tend to share their normative values with close friends. In contrast, norms are less likely shared with co-workers, classmates, and neighbors, who are not 'chosen' as friends are. The larger a subject's expectations about relatives' or close friends' average donation, therefore, the larger the subject's donation because he/she is likely to find the same norms binding. On the opposite, I hypothesize no *specific* relation between a subject's donation and his/her beliefs about the average donation by co-workers, classmates or neighbors, who need not share the same norms (leaving aside family business). Regarding members of the subject's church (if any), further, one might expect them to have similar norms as the subject, although the relation would be possibly less strong than the relation with relatives or friends.

To check my hypotheses, Table 5 below reports the results of a regression analysis. Most of the models are non-linear, of an exponential character as Model 4 in Table 5. The dependent variables always include the subject's belief about the average donation by other participants in the session, which remains always significant in Models 1 to 6. The other

[37] More precisely, the question was: "How much do you think would be the average donation (between 0 and 30 soles) of your: a) Co-workers, b) College / University classmates, c) Neighbors, d) closest friends, e) family, and f) Church members?" Depending on their personal circumstances, subjects could leave some answers unanswered.

variables have also a positive effect on donations, but only significant for the beliefs about the average donation by relatives, close friends and co-workers. Hence my hypotheses are not rejected. When we consider models with several beliefs like Models 7 and 8, however, some of the mentioned variables fail to have a significant effect. I can venture it is due to the low number of observations (due in turn to the reduced number of responses to some of my questions). I, however, discard multicollinearity, as the maximum VIF is 2.52 (for details see Test 12 in Appendix II). In short, my preliminary evidence is in line with my hypotheses, although further research is warranted.

Independent variable: Beliefs about average donation by…	**Non-Linear Models. Dependent variable: Log (Donation + 1)**							**Linear model**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
1. Other subjects	0.0267**	0.0363***	0.0371***	0.342**	0.0331***	0.0493***	0.0394**	0.131
	(0.012)	(0.009)	(0.011)	(0.016)	(0.011)	(0.015)	(0.018)	(0.092)
2. Co-workers	0.0334**						0.00986	0.315*
	(0.015)						(0.032)	(0.159)
3. Family members		0.0386***					-0.0146	-0.068
		(0.011)					(0.04)	(0.199)
4. Neighbors			0.0202				0.071	0.476**
			(0.014)				(0.042)	(0.209)
5. University /college mates				0.0101			-0.0403	-0.451**
				(0.022)			(0.035)	(0.176)
6. Close friends					0.0284**		0.0465	0.394*
					(0.014)		(0.039)	(0.195)
7. Same church members						0.0151	-0.0376	-0.430***
						(0.013)	(0.028)	(0.144)
Intercept	0.721***	0.526***	0.710***	0.821***	0.688***	0.742**	0.620**	0.592
	(0.164)	(0.138)	(0.151)	(0.21)	(0.153)	(0.182)	(0.224)	(1.118)
Obs.	78	99	95	47	96	65	36	36
R-square	0.19	0.248	0.157	0.133	0.161	0.177	0.45	0.61

Note: Data comes from Session 2 and INFO. Robust standard errors in parentheses. All models are estimated by OLS. All non-linear models satisfy homocedasticity, and models 1, 3, 4, 5, and 7 accomplish the residual error's normal distribution assumption, all models satisfy the non-multicollinearity (VIF less than 2.52). *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$.

Table 5: Regression analysis of the 'shared-norms' argument

Result 3 (strength of norms): People give more if they expect close relatives and friends to give substantially as well. Groups whose members are not chosen by the subject or do not play a role in her education have no systematic effect.

As a final remark, the correlations observed admit at least another interpretation aside from the 'shared norms' argument just cited. In effect, I have assumed so far that subjects compare with other subjects when deciding their donations. However, it could be that subjects have in mind additional reference groups when deciding, like family members or co-workers. This could create additional peer effects to those in Hypothesis 3. Still, this argument cannot explain why some groups happen to be significant in the regression analysis and others do not, particularly when we focus on those groups for which the number of observations is relatively large.

3.4 The NGO treatment

I run this treatment as a further test of the model, which makes here similar predictions as in Control. Again, a subject's donation depends on (i) how competent she expects the NGO to be, (ii) her beliefs about the average donation by others, and (iii) the intensity with which she has internalized the norm. Although I expected that subjects would donate more to the NGO than the Government, Table 3 above indicated this not to be the case (the difference is not significant, though; Mann-Whitney test, $p = 0.5298$; Test 13). Several reasons could explain this. Even if subjects trust the NGO and believe that their donations will not be stolen or wasted, first, they might think that the expected increase of the social welfare per Sol donated is not as high as they expected. In particular, they might consider that a Sol donated to the government is more effective because, although part of it is wasted, the rest goes to fund a diverse list of goods and services that are much needed (including attention to cancer patients). Briefly, the government is more "important" than the NGO. Another possibility (although one I do not find very convincing) is that the NGO does not actually enjoy a good reputation. A third one, that subjects expected a low average donation in this treatment, seems not to be valid because median beliefs are not lower in NGO (Mann-Whitney test, $p = 0.1513$; Test 14). My model predicts ceteris paribus a positive relation between a subject's donation and her/his beliefs, and this is indeed supported by the data.[38] Table 6 reports the results of a regression analysis focused on this treatment.

[38] The ceteris paribus clause assumes that subjects have similar perceptions regarding the effectiveness of one Sol donated to the NGO; this is implicit in my analysis. If subjects were heterogeneous, in contrast, a subject with low beliefs but a perception that the effectiveness is high might donate more than another who expects a large average donation but thinks that the effectiveness is low.

Models 1 and 2 are OLS linear regressions where the dependent variable is the subject's donation to the League against Cancer. We can see that the sign of the estimated coefficient of variable 2 (beliefs) is positive, as predicted, and the coefficient itself highly significant. My model does not predict other correlations, and hence the (marginally) significant correlations additionally observed in these models are left unexplained. Note however that some of these correlations become non-significant in Model 3, a non-linear model of an exponential character (as Model 4 in Table 4 above). In contrast, beliefs are still highly significant in this non-linear model. Observe as well that the coefficient of determination or R-squared is larger in these models than in the models used to analyze donations to the government.

	Dependent variable		
Independent variable	**Donation**	**Donation**	**Log (Donation + 1)**
	(1)	**(2)**	**(3)**
1. Corruption (1: least - 168: most)	-0.010*	-0.015**	-0.003
	(0.005)	(0.006)	(0.002)
2. Support to current president (0: not at all, 10: entirely)	0.124	0.151	0.058*
	(0.097)	(0.103)	(0.032)
3. Government is controlled by (0: few interests, 10: works only for the people)	-0.063	0.039	0.025
	(0.108)	(0.144)	(0.045)
4. Belief average donation others	0.395***	0.413***	0.087***
	(0.088)	(0.091)	(0.028)
5. Beliefs in a just world (0: only luck, 10: only personal effort)	-0.192*	-0.243**	-0.0275
	(0.106)	(0.119)	(0.037)
6. Equality preferences (0: none - 10: maximum equality)	0.045	0.075	0.009
	(0.093)	(0.092)	(0.029)
7. Weekly frequency of watching news (in tv, internet, and others)		-0.0968	-0.0091
		(0.299)	(0.094)
8. Gender (0: Male, 1: Female)		0.153	0.106
		(0.643)	(0.203)
9. Age		0.0746	0.0276*
		(0.048)	(0.015)
10. Political preferences (1: extreme left, 10: extreme right)		0.0925	0.0379
		(0.156)	(0.049)
11. Trust others (1: never, 10: always)		-0.257*	-0.095**
		(0.141)	(0.044)
12. Education		-0.721*	-0.188
		(0.415)	(0.131)
13. Socio-economic level		1.102**	0.317**
		(0.429)	(0.135)
Intercept	2.691*	-0.192	-0.818
	(1.382)	(2.292)	(0.722)
Obs.	58	54	54
R-squared	0.36	0.62	0.56

Note: Robust standard errors in parentheses. All models are estimated by OLS. Models 2 and 3 control as well for the subject's perceptions about the government's performance in the last 5 years (0: Lousy, 10: Excellent), willingness to pay more taxes if government improves public services (0: No, 1: Yes), car ownership (no:0, yes:1), and whether he/she has children (0: No, 1: Yes). Neither of these variables is significant in any model (not even marginally). All models accomplish homocedasticity (Breusch-Pagan Test) and residual error's normal distribution assumptions. The mean VIF equals 1.7 in models 2 and 3. ***, **, and * indicate significance at 1%, 5 %, and 10% levels, respectively.

Table 6: Regression analysis of determinants of donation to NGO

Result 4 (NGO; peer effects): A subject's beliefs about the average donation to the NGO by other subject's co-move with her donation.

3.5 What about altruism, warm-glow, and reciprocity?

I finish this chapter with a brief discussion about some other utility models. Note first that altruistic subjects should condition their donation on the efficiency of the government in the provision of public goods, as they care about social efficiency ('size of the cake'). For the same reasons, altruistic subjects should condition the donation on their perceptions of corruption, at least if they believe that corruption does not foster growth. Hence Result 1 (Donations depend non-linearly on the subject's perceptions about the competency of the government) seems well in line with a theory of altruism.

Models of reciprocity like Rabin (1993), in turn, predict that people will be kind (unkind) towards someone who treated them kindly (unkindly). If I analyze the experiment as a one-shot decision problem, this general idea of reciprocity predicts zero donations to the government. Alternatively, one could find more sensible to embed the donation decision into a 'super-game' in which subjects first interact with some other 'players' (public sector employees, taxpayers, etc.) and then decide how much to donate. In this setting, one might argue that if a reciprocal subject had 'bad' prior interactions with corrupt government employees or politicians then she would treat them unkindly, i.e., donate nothing. Although I tend to view this argument too vague to be falsifiable, result 1 seems basically consistent with it. Note yet that this type of argument hardly explains donations to the NGO, as interactions with the League are likely to be infrequent in my sample.

In any case, the main problem of these two theories is that they cannot anticipate the correlation between beliefs and donations (Results 2 to 4). Altruistic or reciprocal people should give money (or not) independently of what others are expected to do. For instance, a reciprocal subject with a good record of interactions with government officials and employees would like to reward them, hence giving money to the government in the hope that some of that money helps those employees. This behavior would not be affected by the expectation, say, that other subjects are not giving anything to the government. In this respect, results 2 and 4 are therefore the strongest evidence in favor of a social norms account.

Chapter 4

Two policy rules tested: The 2018 sessions

Using basically the same protocol as in the previous sessions (see Section 3.1), I run three new ones in August 2018. A difference with the prior design is that at this time I incentivized questions 9, 11, 12 and 14 in Part 2 of the questionnaire, that is, Q9: What do you believe to be the average donation of the participants present here? Q11: What do you think was the tax to GDP ratio in Peru in 2017? Q12: Indicate what you believe to be the position of Peru in the TI ranking for the year 2017, and Q14: How do you believe that the Peruvian government allocates the national budget? At the end of each of the three sessions, more precisely, I randomly selected (i) one of these four questions and (ii) one of the subjects who correctly answered that question,[39] and this subject earned 30 soles for this correct answer. The actual answers to these questions are shown in Appendix I.

One of the three sessions (*Control session 3* henceforth) was a replication of the Control treatment studied in 2016 and 2017. The goal of the other two sessions was to explore the potential effects of two policies on giving to the government. One session thus corresponded to the so-called Informed Policies (IP) treatment, identical to the control treatment except that subjects received some information in the instructions about two projects of public infrastructure actually developed by the central government in Lima. The first one was line 2 of Lima's subway, and the instructions mentioned some of its benefits for the citizens –e.g., a reduction of traffic jams and pollution– together with the expected cost and date of completion. The second one was the New Children's Hospital, where I mentioned the number of patients attended in a daily basis and the kind of medical cases it is able to service. Consult the instructions in Appendix I for the precise description of each project. In line with the model presented in Section 2, I conjectured that subjects would be more willing to give if they are happy with the way in which the government uses the money. Yet people can be sometimes unaware or not very well informed about government spending (I provide indeed evidence in this line). Given information about two specific (and arguably positive) examples, people might

[39] I wrote each individual ID code in a little piece of paper. These pieces were introduced into an opaque bag, from which one subject took out the winner.

update their beliefs and hence give more. In short, an increase in the average/median donation was expected in IP compared to Control.

Finally, the third session corresponded to so-called Public Figure (PF) treatment. Again, the design exactly replicated the Control treatment, except that the instructions mentioned "Centro de Rehabilitación Natalia Málaga S.A.C", a firm that attends people with severe injuries and is owned by the homonym Peruvian Olympic medalist, coach of the juvenile volleyball team. The instructions added as well that this firm pays punctually its taxes according to the public information released by the Tax Agency of Peru –for the precise wording, consult again the instructions in Appendix I. Recall in this respect that the model presented in Section 2 predicts that giving is conditional, so that, people give more if they expect others to give as well. More to the point, further, I conjecture that this conditionality depends on the identity of the agent's referents. In particular, the example set by well-know and reputed public figure should have a relatively larger effect on giving than the example set by an average, random person. In short, an increase in the average/median donation was expected in PF compared with Control.

4.1 Summary of results

Table 7 presents some descriptive data regarding the distribution of donations in each session run in August 2018. We observe the highest average donation in PF (4.96 soles) as well as differences across treatments in the distribution of donations. Consistent with the hypothesis stated above, indeed, the median donation was 3 Soles in both IP and PF, but 0 in Control, and the Median test indicates a significant difference in both IP ($p > 0.032$; test 15) and PF ($p > 0.016$; test 16) with respect to Control. The results of a Wilcoxon rank-sum test are similar for IP ($p > 0.0304$; test 17) and PF ($p > 0.0022$; test 18). I explore later the causes of these differences across treatments.

Treatments	Number of Subjects	Average Donation	Standard Deviation	Subjects by interval of donation (% in parentheses)				
				0	[1,4]	[5,9]	[10,15]	[16,30]
Control Session 3	39	2.60	5.59	21 (53.85)	11 (28.21)	3 (7.69)	3 (7.69)	1 (2.56)
Informed Policies (IP)	40	3.60	4.19	13 (32.5)	12 (30)	9 (22.5)	5 (12.5)	1 (2.5)
Public Figure (PF)	38	4.96	5.26	8 (21.05)	15 (39.47)	4 (10.53)	10 (26.32)	1 (2.63)
All treatments	117	3.71	5.09	42 (35.9)	38 (32.48)	16 (13.68)	18 (15.38)	3 (2.56)

Table 7: Descriptive statistics of each treatment

This time, the average subject (N = 117) for all treatments was around 38 years-old, slightly oriented to the right side in politics (6 out of 10), and more religious than the half line (6 out of 10). Further, he/she still believes that Peru is a rather corrupt country (position 131 out of 180 countries[40]) and thinks that personal income depends more on personal effort than luck or influences: If 0 (10) means that income depends on luck (effort), the average subject evaluates in 7 the relative importance of both factors. I find no significant distributional differences across experimental groups with regard to gender, political ideology, socio-economic status, and religiosity (two-sample Mann-Whitney tests; $p > 0.3677$ always except for the comparison between control and PF regarding status, where $p = 0.1388$; results are similar with a Kolmogorov-Smirnov test; consult tests 19 to 30 in appendix II).

4.2 Determinants of the donations: A test of my predictions

Although there are 42 subjects across all 2018 treatments who give nothing (around 36% of the whole sample), I note however that donations are still statistically significant in all treatments (Wilcoxon signed-rank test; p-value < 0.001 always; tests 31, 32 and 33), thus confirming again the rejection of Hypothesis 1 (see 3.3). In addition, I check whether Result 1 above, and particularly the results from the regression analysis reported in Table 4, replicate with this new data. As the reader may recall, the model predicts that a non-selfish subject's donation depends on her belief that the government is competent and works for the common good, or on how efficient it is in maximizing SWF (20). The analysis in Table 4 above indeed shows such positive correlation. To check this again, I made some new regressions with all the evidence available (i.e., pooling all data from years 2016-2018).

In Table 8, more precisely, I pool the data from all sessions of Control, INFO, IP and PF treatments. Models (1) and (2) are *linear* OLS models where the dependent variable is a subject's donation to the Government, in Soles, but restricted to those subjects whose donation is larger than zero.[41] Model (1) includes the main explanatory variables considered by my theory. Model (2) adds some other variables collected in the experiment,[42] and it slightly improves Model (1) in terms of the adjusted R-squared. In any of these two models, I observe that the support to the current president, has the expected positive sign and is significant at the

[40] This is approximately the same relative position that I obtained in 2016-2017, using the 2015 TI Ranking. Peru was then ranked 126 out of 168 countries.

[41] I focus on these subjects because, recall, the model only predicts a correlation between donations and perceptions about government competence for the non-selfish subjects. In contrast, the decision by selfish subjects to donate nothing is theoretically unaffected by their perceptions.

[42] I do not report the whole analysis here, as models 2 and 3 also control for the subject's age, weekly frequency of watching news (in tv, internet, and others), and number of cars owned. Neither of these variables is significant in any model (p-value > 0.286 always).

1% level, in line with Result 1 above (see Section 3.3). In contrast, the subject's perception about the ranking of Peru in the TI index happens not to be significant –p = 0.771 in Model (1)– and has moreover a positive, non-expected sign. I have checked as well the effect of the variable waste index (only for 2018), using it instead of the TI index in Model (1).[43] While the coefficient of this waste variable has a negative sign, it is hardly significant (p = 0.929). In this alternative model, variables 2 and 3 are still significant (p = 0.054 and 0.008, respectively, see Table A in appendix II) and have the expected positive sign.[44]

Dependent variable	**Donation (D) > 0**		**Ln (D + 1)**	**D = 0**
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**
1. Corruption (1: least - 180: most)	0.00213	0.00297	-0.00051	0.00303
	(0.0073)	(0.0079)	(0.0005)	(0.0029)
2. Support to current president (0: not at all, 10: entirely)	0.45163***	0.40053***	0.02363***	-0.05796
	(0.1238)	(0.1376)	(0.0088)	(0.0490)
3. Belief average donation others	0.19363***	0.22682***	0.02025***	-0.09226***
	(0.0469)	(0.0516)	(0.0034)	(0.0251)
4. Beliefs in a just world (0: only luck, 10: only personal effort)	0.05763	0.03381	0.01147	-0.10115**
	(0.1367)	(0.1450)	(0.0089)	(0.0503)
5. Preferences for equality (0: none, 10: maximum equality)	-0.22422*	-0.22376*	-0.00799	0.07336
	(0.1230)	(0.1345)	(0.0086)	(0.0485)
6. Gender (0: Male, 1: Female)		0.34839	-0.01749	
		(0.7089)	(0.0438)	
7. Political preferences (0: extreme left, 10: extreme right)		0.11962	0.02244	
		(0.2301)	(0.0139)	
8. Education		-0.36243	0.01842	
		(0.4809)	(0.0297)	
9. Socio-economic level		0.88152**	0.00282	
		(0.4397)	(0.0284)	
Intercept	2.25759	2.77278	0.14047	-0.0578
	(1.8098)	(3.2765)	(0.2175)	(0.7112)
Obs.	197	181	247	280
Adjusted R-square	0.1213	0.1588	0.1682	0.0791

Note: Robust standard errors in parentheses. Models 1, 2 and 3 are estimated by OLS. Models 1 and 2 do not satisfy the homocedasticity assumption (Breusch-Pagan test, p-value = 0.001), while model 3 does accomplish it, all models apparently satisfy non-multicollinearity, as signaled by a VIF of less than 1.18 for any coefficient in all regressions. ***, **, and * indicate significance at 1%, 5 %, and 10% levels, respectively.

Table 8: Regression analysis of determinants of donations

Model (3) is a non-linear model where the dependent variable is Ln(D+1), D being the subject's actual donation to the government. This model uses all observations, including nil

[43] This is question 16 in Appendix I: Out of each 100 soles that the Peruvian Government collects in taxes, which part do you estimate that ends up being wasted or in the hands of corrupt authorities?

[44] Table A in appendix II contains 3 alternative models. The first one is the variation of model 1 in table 8 just described, using the waste index. The second model contains a dummy variable that divides the sample in control group (value 0) and IP and PF (value 1). Finally, the third model uses all sessions (2016, 2017 and 2018) and applies logarithm only to positive donations.

donations –I have checked that essential results do not change otherwise. The corruption variable 1 shows the expected sign but not a significant correlation with the donation. In contrast, variable 2 shows a strong significance at the 1% level, again in line with Result 1 above.

Model (4), in turn, is a logistic regression where the dependent variable is a dummy taking value 1 when the corresponding subject gives nothing.[45] We can observe that variables 1 and 2 are not determinants of a nil donation. As it was mentioned before, this is not inconsistent with my theory: Selfish subjects give nothing, but their choice is not predicted to be correlated with these variables. In summary, I overall interpret the evidence in Table 8 as consistent with the model and Result 1. Yet support to current president seems to have a more significant explanatory role than those variables measuring perceptions about corruption or government waste. Further, non-donators do not exhibit any clear pattern regarding these variables.

The results concerning Hypothesis 3 in Section 3.3 above are replicated as well with the new evidence. In effect Models 1 and 2 in Table 8 report significant and positive coefficients for the variable 3 'average belief'. When non-donators are included in the analysis, see Models 3 and 4, the relationship is preserved: People who give nothing expect a lower average donation than the donators. Hence I find again that donations co-move with beliefs about the average donation in the reference group, and the relation is highly significant considering different sessions individually and all sessions altogether.[46]

I consider now a different issue, not explored before. To motivate it, recall that the model and more precisely SWF (20)

$$W^E(x, \delta) = s(x) + \delta \cdot \varepsilon(x)$$

implies that subjects can be heterogeneous with respect to how much weight they give to inequity when assessing the social desirability of a payoff distribution. This can be relevant to predict behavior. In effect, consider those subjects who have a large δ. If they *moreover* believe that a large share of the government money funds redistribution and anti-poverty programs, these subjects should contribute relatively more because they believe that their taxes are more 'useful' in social welfare terms, as they help to reduce inequity. Hence, deviations from the E-norm are relatively painful for them.

[45] Results are robust to the inclusion of controls as in Models 2 and 3; detailed results are available from request.
[46] One result in Table 8 that was not observed before (see Table 4) is the correlation between the amount donated and the socio-economical level (variable 9) which is significant at the 5% level and positive in Model (2). This effect disappears in Model (3), though.

Hypothesis 4: Among those subjects who donate something, the amount donated directly depends on their concern about inequity, provided that they have sufficiently large expectations about the share of the public budget focused on social programs.

Evidence: In my questionnaire (see Appendix I), I elicited a subject's belief about the percentage allocated to social programs in the Peruvian national budget and also asked the following question: "Do you believe that the distribution of income in a society should be as egalitarian as possible?" which subjects had to answer using a number from 0 (completely disagree) to 10 (completely agree). This is variable 5 in Table 8. In Model (1), even though it is marginally significant ($p = 0.07$), it has however the unpredicted sign, i.e., negative. Still this analysis does not consider the possibility that the effect predicted by Hypothesis 4 happens only for those subjects with large enough expectations about the share that social programs take in the public budget. Hence, I divide the sample of donators in 2018 ($N = 75$) in two halves,[47] depending on whether their expectations are below or above the median belief, which is 20%. Then I explore a regression model similar to Model (1) in Table 8 but where, instead of variable 5, I use an interaction with a dummy that takes value 1 if the subject's expectation is above the median. In other words, I focus on those subjects who believe that social programs are a relatively large part of the budget. This new variable takes again a non-predicted negative sign but is non-significant ($p = 0.907$, see Table E in appendix II). Hence, I reject Hypothesis 4.

An even more subtle determinant of donations refers to what psychologists call the *Just World Hypothesis* (Lerner, 1980): People have a strong desire or need to believe that the world is an orderly, predictable, and just place, where individuals get what they deserve. For instance, they may believe that income is mostly determined by effort, and not by chance. Strong believers in this hypothesis might conclude that social programs are not fair, as they reward those who do not deserve it. This is basically equivalent in my model to having a small δ.

Hypothesis 5: Among those subjects who donate something, the amount donated inversely depends on the strength of their beliefs in a just world, provided that they have sufficiently large expectations about the share of the public budget focused on social programs.

Evidence: In the questionnaire, subjects were asked to indicate numerically their opinion about the relative importance of two factors in determining a person's income: (a) Chance and influences of other people and (b) the extent to which the person strives to work hard in life. Opinions could range from 0, that is, factor (a) is the only important one, and 10, signifying that personal endeavor (b) is the unique determinant. A large number, therefore,

[47] I focus on the 2018 sessions because, as explained in 3.1, it seems that subjects in prior sessions misunderstood the questions about the public budget terms, as they were then stated.

indicates a stronger belief in a just world. While subjects tend to believe that effort is the main determinant of personal income, (the median and average responses are 8 and 7.2, respectively), Model (1) in Table 8 shows a non-significant relationship ($p = 0.674$), and moreover the sign of variable 4 is positive, contrary to what Hypothesis 5 states. I get the same result ($p = 0.07$) if I instead assume that the effect is restricted to those subjects with beliefs about the relevance of social programs above the median (see Table E appendix II), as I did before for variable 5 (equality). In summary, Hypothesis 5 is also rejected.

What about the people who gave zero Soles? To my surprise, Model (4) indicates that non-donators believe significantly less in a just world than donators. In fact, they are even more egalitarian, although not in a statistically significant sense. Note well that these effects remain significant even after controlling for the subject's trust in the current government and political ideology. I do not have a good explanation for this intriguing result. In summary, I reject Hypotheses 4 and 5 and sum up my discussion as follows:

Result 5: Neither a preference for equity nor a perception that income depends on chance (and not effort) correlate positively with the amount donated, at least among those subjects who donate something. It seems therefore that fairness considerations do not account for behavior within that group. In contrast, non-donators are more egalitarian and believe significantly more that income depends on chance.

On a different topic, I have also checked the potential effect on donations of the subjects' beliefs about Tax-to-GDP ratio and the composition of the public budget, as measured respectively by Questions 11 and 14 in my incentivized 2018 questionnaire (Part 2).[48] I had several conjectures in this respect: (i) a relatively large expectation about Tax-to-GDP ratio reduces a subject's donation, (ii) a relatively large expectation about the percentage that goes to salaries in the public budget reduces a subject's donation, and (iii) when a subject states large differences between the percentages going to social programs or infrastructures in the actual budget (Question 14) and the respective percentages in her ideal budget (Question 15), her donation is reduced. Nevertheless, when I run a regression similar to Model 1 in Table 8 above, but including now additional variables as the subject's responses to Question 11 and the actual ratio (12.9%), and the differences between the answers to Questions 14 and 15, I find no support for conjectures (i) to (iii). The decision of how much to donate, therefore, does not seem to be motivated by such considerations (See Table F in appendix II).

[48] Unfortunately, I can use only data from the 2018 sessions since those questions were not included in the previous years in the same terms

Interestingly, the decision whether to donate appears to be influenced by these variables. To explore this point, I run a logit regression similar to Model 4 in Table 8 but including now the variables cited in the prior paragraph. Here we observe that a subject's expectation about Tax-to-GDP ratio has a positive coefficient of 0.01958, which is rather significant (p-value = 0.026, Table F in appendix II). The interpretation is that having a relatively large expectation about tax-to-GDP ratio increases the chances that one does *not* give to the government. In contrast, a relatively large expectation about the share in the budget that goes to salary payments is not significant (p-value = 0.202). We also observe that subjects who state relatively large differences between (a) the expected percentage going to infrastructure investments and (b) the desired, ideal one, are more likely not to give, although the effect is not significant (p-value = 0.165). One potential implication of these findings is that variables like (beliefs about) Tax-to-GDP ratio have a non-linear effect, so that they affect the decision whether to donate, but not the exact amount donated (among those who decide to donate). The next section explores this interpretation further.

4.3 Exploring the differences across treatments: Discussion

As I explained in Section 4.1, there is a significant treatment effect in both IP and PF. To recall, the median donation was 3 Soles in both treatments, but just 0 in the control. As I have explained before, I think that the higher donations in the Public Figure treatment are due to the positive effect of the referent given. In treatment IP, in turn, my hypothesis is that the information about the two specific public projects leads subjects to update their beliefs about the competency of the government, making them more accurate and positive. This would lead in turn to higher donations, compared to the control. There are a few clarifications to be made in this respect, though.

First, the treatment effect happens basically at the level of the non-donators. That is, the effect reduces the fraction of subjects who give nothing. This is indicated by Model 4 in Table G in Appendix II, analyzing the determinants of a nil donation. The 'treatment' variable 10 takes value 1 if the subject participated in IP or PF, and its coefficient is highly significant (p = 0.002) and moreover of a negative sign. In contrast, this same variable is irrelevant (p = 0.386) in Model 2 in the same table, which focus on those who give something. Interestingly, the effect is significant at the 1% level in Model 3, suggesting again a non-linear treatment effect on donations: The treatment affects the decision whether to give, but not so much the amount donated.

One rationale for the IP treatment, *second*, was our conjecture that people are in general 'too' pessimistic about the performance of the public sector, so that informing them about some successful projects should make them less pessimistic. In this line, I guessed that subjects in all treatments would over-estimate the position of Peru in the TI index and the tax-to-GDP ratio. These conjectures are vindicated by the data. To start, Peru was in the 96th position of the Transparency International corruption perceptions index for 2017, out of 180 countries. Of the 117 subjects, however, 76.92% of them over-estimated this position. Indeed, the average estimated position was 130.6, and the average error equal to 56. Interestingly, Figure 5 below shows that this over-estimation was less accused in the IP treatment, whereas the differences between the control and the PF treatments were not significant (Table 9 below offers evidence in this regard). With respect to the tax-to-GDP ratio of Peru in 2017, the actual figure was 12.9%, but subjects made an average evaluation of 44.8. Indeed, a percentage of 91.5% over-estimated the actual figure, and the mean error was 26.5.

As another rationale for the IP treatment, *third*, I also conjectured that subjects would under-estimate social spending and public investment in infrastructures, items that are often considered in good terms. This does not seem to be supported by the data. The fractions actually allocated in the 2016 public budget to social programs, infrastructure, salaries, and other expenditures were respectively of 8.16, 16.9, 34.66, and 40.28%. Yet the subjects' average beliefs were 21.2, 26.4, 36.5 and 15.9%, respectively. Contrary to my a priori, therefore, subjects do not under-estimate social spending and public investment in infrastructures. Note however that the actual picture is possibly more complex, as at the same time the average subject grossly underestimates the item called 'other expenditures'. I believe that this underestimation is possibly due to the subjects' lack of awareness of the many sub-items included within this large category, and guess that they would have reported much lower figures for the other categories had they been aware of that issue. In any case, I note that the average difference between the subjects' beliefs about each budget share and the corresponding ideal share are -9.9, -6.5, 13.8 and 2.3, respectively. Since the two first numbers are negative, people do not seem to be satisfied with the percentages devoted to social and infrastructure programs in the public budget.

In summary, subjects do not seem very optimistic or satisfied with the working of the Peruvian public sector, and this is relevant because my prior analysis shows that some variables like trust in the government play a significant explanatory role in the experiment. A natural question is then: Do subjects give more in the PF or IP treatments due to a change in the subjects' perceptions, as measured by my questionnaire? Overall, the evidence suggests a

negative answer, as I find few significant differences across treatments in the distributions of the individual variables. In effect Table 9 depicts the mean and median answers to several questions appearing in Parts 2 and 3 of the experiment, and the only prominent differences appear when comparing the beliefs about corruption (see also Figure 5 below), tax-to-GDP ratio, and the percentage of the public budget going to social programs. However, some of these variables, e.g., corruption as measured by the TI index, have no effect in the regression analysis reported in Table G in Appendix II. Hence it seems unlikely that their change explains any treatment effect. The individual perceptions about tax-to-GDP ratio, in turn, were positively correlated with the probability of giving zero (see Model 4 in in Table G in Appendix II). Since these perceptions have a larger average and median value in treatment IP, however, they can hardly explain why subjects give more in IP than in Control.

	Control		PF		IP	
	Control-IP		Control-PF		IP-PF	
	Mean	Median	Mean	Median	Mean	Median
1. Corruption (1: least - 180: most)	150	160***	132	160	110	140
2. Support to current presidential team	4.15	5	5.08	5	4.2	3.5
3. Beliefs about average donation by others	9.36	5	8.63	5	6.5	5
4. Beliefs in a just world (0: only luck, 10: only personal effort)	7.05	7	6.42	6	6.9	8
5. Equality preferences (0: None - 10: Maximum equality)	6.03	6	5.5	5.5	6.13	7
6. Waste Index	71.59	80	66	70*	66	70
7. Beliefs of Tax-to-GDP ratio	41.96	40*	40.11	30	52	50**
8. % going to social programs	20.97	20*	17.95	20	24.47	20**
9. % going to infrastructures	26.03	20	26.68	25	26.57	25
10. % going to salaries	38.38	40	38.16	40	33.13	30
11. % going to other expenditures	14.62	10	17.21	10	15.83	10
Number of subjects	39		38		40	

Note: Each cell shows the average (left) and median (right) value of the corresponding variable in the corresponding treatment, indicated in columns. In column Control/ PF /IP symbols ***, **, and * indicate a significant difference at 1%, 5 %, and 10% levels, respectively, between the distributions of the corresponding variable in treatments Control vs. IP/ Control vs. PF/ IP vs. PF.

Table 9: Average and median responses in Parts 2 and 3 of the 2018 sessions, conditional on treatment

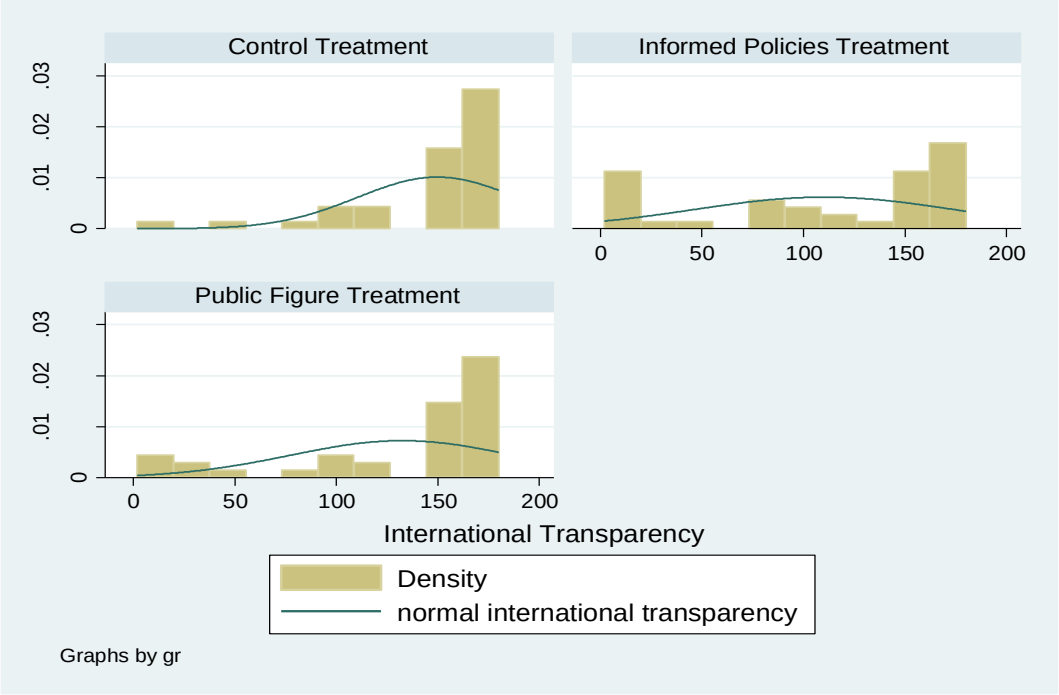

Figure 5: beliefs about corruption, conditional on treatment

Conclusions

This thesis makes four main contributions to the literature on tax compliance and tax morale. First of all, I formally explore how social norms and a dislike to deviate (much) from them affect tax evasion. Consistent with much of the literature on social norms (e.g., Bicchieri, 2005), I set a model that incorporates norms both in a descriptive and prescriptive sense, i.e., people care about what the norm prescribes or commends but also whether others respect the norm. Also, the model helps to explore in a precise manner the several forces that shape tax compliance together with their net effects. Further, it suggests several ways in which governments could affect tax compliance, although they may not be easy to implement. For instance, a straightforward moral from the model is that evasion would ceteris paribus decrease if taxpayers improve their perceptions about how efficient, corrupt or wasteful the public sector is, or about how generalized tax evasion is. For granted, improving such perceptions can be extremely difficult. But knowing that it might pay in terms of higher tax receipts is not irrelevant. Another implication is that transparency in how government revenues are spent is not irrelevant: If taxpayers are ensured that some taxes will be used to fund specific public goods that they deem socially beneficial, I predict that evasion will be relatively diminished. The model also suggests that some of the differences in the levels of tax evasion observed across countries are due to differences in the taxpayers' perceptions.

As a second contribution, I run experiments in Peru and offer evidence in line with the model. I observe that people are very heterogeneous in their behavior, conditioning their donations on their perceptions about competency and corruption in the public sector, but also on how others behave. Again, I believe that this model helps to understand the complexities that derive from heterogeneity and the existence of different channels affecting compliance. I stress that the subjects were representative of the taxpayer population in Lima, which might be an important point in evaluating the external validity of the results. Further, these results complement those from field experiments like Blumenthal et. al. (2001), who study whether including messages about (descriptive) social norms in letters sent to taxpayers before the filing deadline affects compliance. They find no effect of a message that 93% of the taxpayers report their taxes correctly. Perhaps the remaining 7% were simply unconcerned about norms, as this model concedes, or maybe they thought that tax receipts were inefficiently used by the state. Lab studies like this can offer insights into this literature, as they allow to control the many factors that might affect compliance.

Third, I explore two policies to increase giving to the government. In the IP treatment, subjects receive information about two public projects recently developed in Lima. In PF, the instructions mention a firm, owned by a famous Olympic medalist, remarking that it pays its taxes punctually and has no debts with the Tax Agency. In both cases, I observe a significant increase in the median donation, relative to the baseline. Since I also have evidence that people have in average rather pessimistic beliefs about the public sector, the evidence from the IP treatment readily suggests a policy that could improve tax compliance: Inform taxpayers about specific, successful public projects. The implications from the PF treatment are also straightforward, in particular in what regards the use of respected and well-known public figures in campaigns to promote tax compliance.

Fourth, these results provide an additional test of the standard, homo economicus, model together with several models of non-selfish preferences. While the standard model is valuable because it is extremely parsimonious, it seems to provide a limited account of the phenomenon of tax evasion. Of course, it is a natural question whether my results would hold as well if the subject's endowment was much larger. In my experiment, for instance, around half of the people give more than 16% of their endowment to the government, which is worth mentioning since it looks very close to the actual average rate[49]. However, the natural question turns to be: would *exactly* the same happens as well if, say, income taxes were voluntary? Although I do not have controlled data on this point, I nevertheless tend to doubt so: material incentives are indeed not to be under-estimated. But even if social norms are (possibly) less strong determinants of tax compliance than material interest for most taxpayers, my analysis suggests that they affect behavior. This means that governments can use these levers to reduce evasion, sometimes at a reduced cost –e.g., Hallsworth et al., 2017. Future research should anyway analyze the strength of these normative concerns.

[49] Average income tax rate of Peru is 17.8%

Conclusiones

Esta tesis hace cuatro contribuciones principales a la literatura de la moral fiscal y el cumplimiento tributario. En primer lugar, explora formalmente cómo las normas sociales y una aversión a desviarse de ellas afecta a la evasión de impuestos. En efecto, de acuerdo con gran parte de la literatura sobre las normas sociales (p. ej., Bicchieri, 2005), propongo un modelo que incorpora normas en un sentido descriptivo y prescriptivo, es decir, a la gente le importa lo que la norma prescribe, pero también si otros respetan la norma. El modelo también ayuda a explorar de manera precisa las varias fuerzas que configuran el cumplimiento tributario junto a sus efectos netos. Además, sugiere varias maneras en que los gobiernos podrían influir en el cumplimiento tributario, aun cuando algunas de ellas no sean fáciles de implementar. Por ejemplo, una moraleja sencilla del modelo es que la evasión, ceteris paribus, disminuiría si los contribuyentes mejoran sus percepciones acerca de cuán eficiente, corrupto o despilfarrador es el sector público, o sobre cuán generalizada es la evasión de impuestos. Por supuesto, puede ser muy difícil mejorar dicha percepción, pero no resulta irrelevante saber que estos factores podrían mejorar el cumplimiento y así proveer de mayores ingresos fiscales al gobierno. Otra implicancia del modelo es que la transparencia en cómo se gastan los ingresos del gobierno no es irrelevante, es decir, si los contribuyentes están seguros de que algunos impuestos se utilizarán para financiar bienes públicos específicos que consideren socialmente beneficiosos, el modelo predice que la evasión decrecerá. El modelo también sugiere que algunas de las diferencias en los niveles de evasión observados entre los países, se debe a diferencias en las percepciones de los contribuyentes.

Como un segundo aporte, se ejecutan experimentos en el Perú y se ofrece evidencia de acuerdo con el modelo. Se observa que las personas son muy heterogéneas en su comportamiento, condicionando sus contribuciones a sus percepciones sobre la competencia y corrupción del sector público, y también al comportamiento de otras personas. Nuevamente, creo que este modelo ayuda a entender las complejidades que se derivan de la heterogeneidad de los sujetos y la existencia de diferentes canales que afectan al cumplimiento. Insisto también en que los sujetos del experimento fueron representativos de la población contribuyente de Lima, lo que podría ser un punto importante en la evaluación de la validez externa de sus resultados. Además, estos resultados complementan los obtenidos en experimentos de campo como los realizados por Blumenthal y otros (2001), que estudian si incluir mensajes acerca de normas sociales (descriptivas) en cartas enviadas a los contribuyentes antes de la fecha límite de presentación de sus declaraciones de impuestos afectan el cumplimiento. Estos autores no

encuentran ningún efecto de un mensaje que señala que el 93% de los contribuyentes declaran sus impuestos correctamente. Quizás al 7% restante simplemente no le importan las normas sociales, tal como este modelo sí admite, o tal vez estos contribuyentes piensan que los impuestos se usan de manera ineficiente por el gobierno. Estudios de laboratorio como este pueden ofrecer mejores intuiciones en este campo de estudio, ya que permiten controlar los numerosos factores que pueden afectar el cumplimiento voluntario.

En tercer lugar, se exploran dos reglas de política alternativas para aumentar las contribuciones al gobierno. Una de ellas, se deriva del tratamiento de políticas de información (IP), que es uno en el que los sujetos reciben información sobre dos proyectos públicos recientemente desarrollados en Lima. La otra se explora mediante el tratamiento de Figura Pública (PF), en el que se hace mención en las instrucciones a la empresa propiedad de una famosa medallista olímpica, remarcando que paga sus impuestos puntualmente y sin deudas con la Agencia Tributaria. En ambos casos se observa un aumento significativo en la contribución media en relación con la línea de base. Debido además a las pruebas de que las personas tienen en promedio creencias bastante pesimistas sobre el sector público, la evidencia del tratamiento IP fácilmente sugiere una política que podría mejorar el cumplimiento tributario: informar a los contribuyentes sobre proyectos públicos específicos y exitosos. Las implicaciones del tratamiento PF también son sencillas, en particular en lo que respecta al uso de figuras públicas conocidas y respetadas en campañas para promover el cumplimiento tributario.

En cuarto lugar, estos resultados proporcionan una prueba adicional del modelo estándar del homo economicus junto a varios modelos de preferencias no egoístas. Aun cuando el modelo estándar resulta valioso por su extrema sencillez, parece proporcionar solo una explicación parcial del fenómeno de la evasión fiscal. Por supuesto, una pregunta surge naturalmente de esta discusión acerca de si estos resultados se sostendrían si la dotación inicial fuera mucho más grande. En mi experimento, por ejemplo, alrededor de la mitad de las personas entregan más del 16% de su dotación al gobierno, lo que es digno de mencionar ya que se aproxima mucho a la tasa media real del impuesto a la renta en el Perú (17.8%). Sin embargo, la pregunta se afina también de forma natural a: ¿sucedería lo mismo si el impuesto a la renta fuera voluntario? Aunque no tengo datos controlados sobre este punto, lo dudo ya que no se deberían subestimar los incentivos materiales. Pero, aún si concluyéramos que las normas sociales son menos importantes como determinantes del cumplimiento tributario que el interés material, mi análisis todavía sugiere que sí afectan el comportamiento. Esto significa que los gobiernos pueden utilizar estas alternativas para reducir la evasión, la mayoría de las veces a

un costo bastante menor – ver por ejemplo, Hallsworth y otros, 2017. En cualquier caso, la investigación futura debería explorar la fortaleza de estas muy interesantes preocupaciones normativas.

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Appendix I: Translated instructions, decision sheet, & questionnaires

(Those parts that appeared only in Control, NGO, INFO, IP or PF treatment are in brackets)

Instructions

Thank you for participating in this Experimental Economics study, financed by a research project. There are no tricky questions here and hence we ask you to answer any questions according to your own preferences. The decisions that you make in this experiment are anonymous; in other words, no participant will know what you or any other participant has decided. We please ask you to turn off your cell phones or other electronic communication devices for a few minutes so that they do not interfere with the experiment.

At the end you will receive a money payoff. It is important that you do not speak with any other participant so that the data which will be collected remains valid. If you have any questions, please raise your hand and one of the people in charge of the experiment will gladly help you.

Description of the Experiment

All participants in this experiment will receive a fixed sum of S/. 20 for simply taking part in the experiment; this remuneration compensates for the transportation costs involved in arriving here.

The experiment is composed of three parts (1, 2 and 3). In part 1, each of you will be endowed with S/. 30 and must decide how much he/she wishes to voluntarily donate to the [**Control, INFO, IP & PF**: Peruvian Government] [**NGO**: Peruvian League Against Cancer, LPLC]. In order to do so, you will anonymously and independently choose an integer number between 0 and 30 (both included) and write it on the first page of your booklet. The remainder of the money will be your payoff for part 1. That is, if you decide to donate X Soles to the [**Control, INFO, IP & PF**: government] [**NGO**: LPLC], you will receive a payment of 30-X Soles at the end of the experiment.

At the end of the experiment, moreover, the sums donated by the participants will be added, and the total amount subsequently deposited in an account belonging to the [**Control, INFO, IP & PF**: public treasury] [**NGO**: LPLC] in an entirely anonymous manner. To do so, the researcher will go to the nearest bank and make an anonymous cash deposit for this amount, without giving any information concerning the origin of the money. This deposit will be made

in the presence of any participants who wish to accompany the researcher; should there be no volunteers, we will personally select two participants at random to be witnesses.

[**Control, INFO, IP & PF**: Keep in mind that the public sector carries out tasks such as the development of infrastructure, the provision of public goods and services such as education, health and security, or the redistribution of wealth through social programs.]

[**NGO**: Keep in mind that the Peruvian League Against Cancer (LPLC) is an institution that helps to fund the medical treatment of cancer patients with limited recourses.]

[**IP**: We give two examples:

- Line 2 of Lima's subway, whose greatest benefit is not only saving money but time. The new line will reduce the trip between ATE and Callao from 2 hours and a half to 45 minutes. Moreover, this project will reduce the number of traffic accidents and pollution. The project involves an investment of US $ 5,658 million, the percentage of work that has been completed is 21% and the line will be in operation by the end of 2022.
- The New Children's Hospital, where more than two thousand children and teenagers with limited resources are attended daily. Some patients enter due to mild or moderate illnesses; however, more serious cases such as traumatisms, burns, and respiratory failures are also treated. This hospital was opened only 5 years ago and is currently in full operation.]

[**PF:** These public expenditures are mostly financed with taxes, paid by those citizens committed with their country. For example, the "Centro de Rehabilitación Natalia Málaga S.A.C" is a firm that attends people with severe injuries. This firm, owned by our Olympic medalist and coach of the juvenile volleyball team, pays punctually its taxes according to the public information released by the Tax Agency of Peru SUNAT.]

Parts 2 and 3 of the experiment are questionnaires containing various questions. Those in part 2 require some estimations, and those in part 3 involve socio-demographic information. All are completely anonymous.

In summary, your final payoff will include 20 Soles for transportation plus 30 Soles minus the amount you donated to the [**Control, INFO, IP & PF**: Peruvian government] [**NGO**: LPLC]. You will be paid in private in an adjoining room by an assistant who will know only your final payoff in the experiment, but not your decisions during the experiment.

Now, please complete part 1 (the first sheet of the booklet) and give it to one of the people in charge of the experiment before starting part 2.

Decision sheet

Part 1 ID number:

[INFO: Important: Before making your decision, we must inform you that we have already done a similar experiment with 60 people in November 2016. Average donation of those people was **5 (five soles)]**

How much are you willing to contribute to the [**Control, INFO, IP & PF**: Peruvian Government] [**NGO**: Peruvian League Against Cancer]?

S/. _____

Note: You must write an **integer number** (no decimals) between 0 and 30 Soles, inclusive; otherwise, you will not be paid. Your pay for part 1 will be equal to 30 Soles minus the amount you indicate on this sheet.

Belief elicitation sheet

Part 2 ID Number:

General instructions: Please answer numerically the following questions:

[Control Session 1 & NGO

Direction: Assuming that there are (30) participants in your room. You must always provide an answer that is an integer between 0 and 30.

1. How many people do you think will donate more than 15 soles?

_____

2. How many people do you think will donate between 10 and 15 soles (inclusive)?

_____ +

3. How many people do you think will donate between 5 and 9 soles (inclusive)?

_____ +

4. How many people do you think will donate more than 0 and up to 4 soles (inclusive)?

_____ +

5. How many people do you think will make no donation (zero soles)?

_____ =

Total **30**

Direction: Assuming that there are (30) participants in your room. You must always provide an answer that is a whole number between 0 and 30.

6. How many people do you think will donate the same amount as you?

a. _____ +

How many people do you think will donate less than you?

b. _____ +

How many people do you think will donate more than you?

c. _____ +

_____ =

Total **30**

7. What do you believe to be the total donation of all the participants that are present here (after adding the contributions of all the participants)?

S/_____]

[Control Sessions 2-3, INFO, IP & PF:

8. What do you think would be the average contribution (between 0 and 30 soles) of -your:

a) Co-Workers S/. _____

b) University/College mates S/. _____

c) Neighbors S/. _____

d) Close friends S/. _____

e) Family members S/. _____

f) Church members S/. _____

Note: Answer only those questions you consider are relevant for your case, for example, if you are a student and do not work leave blank ¨Co-workers¨ but fill University/College mates.]

Direction: Question 9 must be answered with an integer from 0 to 30.

9. What do you believe to be the average donation of the participants present here (between 0 and 30 soles)?

S/. _____

[Control Sessions 2-3, INFO, IP and PF:

10. Of every 100 Soles that enter to the Peruvian Government, what part do you estimate end up wasted or in corrupt hands? Answer with an integer number from 0 to 100, where 0 indicates nothing and 100 indicates everything

S/. _____]

[Control Session 3, IP & PF:

Indication for question 11: The tax to GDP ratio is the percentage (%) of the Gross Domestic Product (GDP) that represents the taxes paid by individuals and companies.

11. What do you think was the tax to GDP ratio in Peru in 2017? The answer (no decimals) must be between 0% and 100%

_____%]

Direction: Transparency international (TI) is a global non-governmental and non-profit organization that annually publishes an index of the perceived corruption in the public sector of each of the countries studied, based on the judgment of experts around the world. In 2015, it analyzed 168 countries and stated its findings in such a way that 1st place indicates the least level of corruption and the country that ranks 168thhas the highest level of corruption.

12. Indicate what you believe to be the position of Peru in the TI ranking for the year **[Control Session 1 & NGO: 2015**] **[Control Sessions 2-3, INFO, IP and PF: 2017]**

N.º _____

[Control session 1 and NGO:

Direction: You must use integer numbers to answer question 13. Bear in mind that we consider a public employee to be one who works in the executive, legislative, or judicial branch of the Peruvian government, regional governments, municipal governments, and the central government, including congressmen, local and regional authorities, ministers, the president of the Republic, and other public workers

13. How do you believe that the Peruvian government administers the national budget? In other words, from every S/ 100 in the budget, how much do you believe the government designates for:

(1) Social expenses S/ _____

(2) Development of infrastructure and public works S/ _____

(3) Payment of salaries of public employees S/ _____]

Total S/ 100

[Control Session 3, IP and PF:

Indication for the four items included in question 14: To answer them, you must indicate integer numbers between 0 and 100. You must take into account that we understand as a public employee the people who work in the executive, legislative and judicial branches of the Peruvian government, regional and municipal governments and the central government, including congressmen, local and regional authorities, ministers, the president of the Republic, and other public workers.

14. How do you think the Peruvian government allocates the national budget? That is, from each S /. 100 of the current budgets, what rounded percentage do you think the government assigns to:

(1) Social spending (Juntos, pensión 65, Beca 18, etc.) _____%

(2) Develop infrastructure and public works _____%

(3) Payment of public employee´s salaries _____%

(4) Others _____%

Note: The sum of the four previous percentages must be 100.

15. How do you think the ideal budget should be?

(1) Social spending (Juntos, pensión 65, Beca 18, etc.) _____%

(2) Develop infrastructure and public works _____%

(3) Payment of public employee´s salaries _____%

(4) Others _____%

Note: The sum of the four previous percentages must be 100.

16. Out of each 100 soles that the Peruvian Government collects in taxes, which part do you estimate that ends up being wasted or in the hands of corrupt authorities? Answer with an integer number from 0 to 100, where 0 indicates nothing and 100 indicates everything.

S/. _____]

Note:

Actual answers to questions 11, 12 and 14 in Part 2 (subjects were not informed of them)

Q11: Tax-to-GDP ratio in Peru for 2017 was 12.9%

(See: https://www.mef.gob.pe/contenidos/pol_econ/marco_macro/IAPM_2018_2021.pdf)

Q12: Peru is in the 96th position of the Corruption perceptions index 2017.

(See: https://www.transparency.org/news/feature/corruption_perceptions_index_2017)

Q14: The fraction allocated to social programs was 8.16% of Budget 2016

(See: https://www.mef.gob.pe/contenidos/conta_publ/2016/gasto_social2016_tomo1.pdf)

The fraction assigned to infrastructure was 16.90%, to salaries 34.66%, and to other expenditures 40.28%.

(See: http://www.ipe.org.pe/portal/el-peso-del-gasto-publico/)

Part 3 **ID Number**

Direction: Please answer the following anonymous questions that will help guide our investigation. Indicate your choice with a cross (X), or the corresponding number or word.

General questions:

Gender: M___F___ **Age:** _____ **Occupation:** _____

Place of Birth:

District _____ Province _____

City _____ Region _____

Place of Residence:

District _____ Province _____

City _____ Region _____

Religion:

Catholic ( ) Evangelical ( ) Other _____ None ()

Level of religiosity on a scale from 1 (not at all religious) to 10 (very religious):

_____

Marital State:

Married _____ Single _____ Stable Relationship _____ Divorced _____ Widow(er) _____

Living Situation:

Own _____ Rent _____ Room_____ I have no housing _____

If you know the answer, please give the approximate size of your main residence:

_____ m^2

Do you have a vehicle?

Yes _____ No _____

Do you have children?

Yes _____ No _____

How many children do you have?

_____

Level of Education:

Primary School incomplete _____ Completed Primary School _____ Completed Secondary School _____

Technical Higher Education _____ University Higher Education _____

Current job:

Student _____ Business Admin./Owner _____ Housewife _____

Employed _____ Currently unemployed _____

How many times per week do you follow national political news in the media (TV, radio, newspapers, internet, etc.)?

0 _____ 1-3 _____ 4-6 _____ 7 _____

In politics, reference is usually made to the "left" and "right." Overall, where would you place yourself on a scale of 0 (extreme left) to 10 (extreme right)?

Far Left	o o o o o o o o o o o 0 1 2 3 4 5 6 7 8 9 10	Far Right

Opinion-type questions:

1. which do you believe to be the factor upon which someone's personal income depends –chance and influences of other people or the extent to which he strives to work hard in life? Indicate your opinion using a number between 0 and 10, the number 0 signifying that chance or external influences are the only important factor, and 10 signifying that personal endeavor is the only important factor. Make a mark (X) in the circle corresponding to the number that represents your opinion.

resulting from chance or influences of others	o o o o o o o o o o o 0 1 2 3 4 5 6 7 8 9 10	resulting from one's endeavor to work hard in life

[Control Session 1 & NGO:
2. Imagine that in Peru there were only three population groups identified by their incomes: group I, group II, and group III, who receive a **monthly** pay of 1 thousand (group I), 4 thousand (group II), and 7 thousand (group III) soles. Displayed below are four hypothetical income distributions that are distinguished only by the percentage of Peruvians found in each group. For example, distribution A: (30, 60, 10) means that 30% of Peruvians receive a monthly pay of S/. 1,000 (group I), 60% receive S/. 4,000 (group II), and 10% receive S/. 7,000 (group III). Indicate your preferred order for these distributions (number them from 1 to 4, with 1 indicating your strongest preference):

Distribution A: (30, 60, 10) _____ Distribution B: (50, 10, 40) _____

Distribution C: (40, 15, 45) _____ Distribution D: (80, 10, 10) _____

3. Which of the four distributions given above do you believe most accurately resembles the current situation in Peru? (Answer A, B, C o D):

_____

4. Would you say that it is advisable to trust people under any circumstances, or rather is it advisable to be very cautious in trusting others? Answer using a number from 0 (we should never trust anyone) to 10 (we may trust anyone under any circumstance)

We should never trust anyone	o o o o o o o o o o o 0 1 2 3 4 5 6 7 8 9 10	We may trust anyone under any circumstance]

5. In general, do you believe that the distribution of income in a society should be as egalitarian as possible? Answer using a number from 0 (completely disagree) to 10 (completely agree):

Completely disagree	o o o o o o o o o o o 0 1 2 3 4 5 6 7 8 9 10	Completely agree

[Control Session 1-2, NGO and INFO:

6. To what extent do you agree that the State should directly participate in the Economy, whether through public companies, banks, or industry? From 0 (completely disagree) to 10 (completely agree)

Completely disagree

o o o o o o o o o o o Completely agree

0 1 2 3 4 5 6 7 8 9 10

7. From 0 (completely disagree) to 10 (completely agree), to what extent do you agree with the following statement: In a democracy, the economy grows less than in other political systems?

Completely disagree o o o o o o o o o o o Completely agree

0 1 2 3 4 5 6 7 8 9 10

8. Consider the following two statements: The Peruvian government is controlled by a few interests who are only concerned with themselves; the Peruvian government governs for the benefit of all. With 0 indicating complete agreement with the first and 10 indicating complete agreement with the second, make a mark (X) in the circle corresponding to the number that represents your opinion.

Controlled by selfish interests o o o o o o o o o o o Governs for the benefit of the people

0 1 2 3 4 5 6 7 8 9 10

9. Do you believe that the Peruvian government adequately provides free public education services?
Yes _____ No____

10. Do you believe that the Peruvian government adequately provides free public health services?
Yes _____ No____

11. Do you believe that the Peruvian government adequately provides public security?
Yes _____ No____

12. In comparison with those who have a low income, how much should those with a high income pay from their personal income? (Indicate only one answer):

Much less _____ Less _____ Equal _____ More _____ Much more _____

13. Overall, how would you rate the performance of the Peruvian government during the previous 5 years? From 1 (dismal) to 10 (excellent): _____

14. In general, do you support the new government in Peru, which was chosen in the election a few months ago? From 1 (do not support at all) to 10 (support entirely): _____

15. Would you be willing to pay a little more in taxes if the government were to make substantial improvements in the free public services it provides (such as education, health, and safety)?
Yes ____ No____]

[Control Session 1 & NGO:

16. If you have in the past paid less taxes than you were supposed to have paid, please choose the option that you consider to be the most relevant justification for your decision:
a) I was not forced to
b) Others did not pay their taxes either
c) The government does not adequately provide basic public services (education, health, and safety); therefore, I do not want to give away money in exchange for nothing
d) The government is corrupt and tax money stimulates more corruption
e) The government is inefficient and public funds are wasted
f) I have never paid less than what I owed]

[Control Session 3, IP and PF:

17. In general, do you support the current Peruvian government? Answer from 0 (do not support at all) to 10 (support entirely):

	o	o	o	o	o	o	o	o	o	o	o	
Do not support it at all												Support entirely]
	0	1	2	3	4	5	6	7	8	9	10	

Appendix II: Detailed tests and regression results

Test 1: Wilcoxon matched-pairs signed-ranks test for NGO – Treatment

Sign	Obs.	Sum ranks	expected
Positive	47	1739	869.5
Negative	0	0	869.5
Zero	13	91	91
All	60	1830	1830

Ho: donation = 0 z = 6.467 Prob > |z| = 0.0001

Test 2: Wilcoxon matched-pairs signed-ranks test for Control (sessions 1 and 2)

Sign	Obs.	Sum ranks	expected
Positive	77	5544	2772
Negative	0	0	2772
Zero	33	561	561
All	110	6105	6105

Ho: donation = 0 z = 8.407 Prob > |z| = 0.0001

Test 3: Wilcoxon matched-pairs signed-ranks test for INFO Treatment

Sign	Obs.	Sum ranks	expected
Positive	45	1440	720
Negative	0	0	720
Zero	9	45	45
All	54	1485	1485

Ho: donation = 0 z = 6.271 Prob > |z| = 0.0001

Test 4: Variance Inflation Factors (Collinearity measures)

Model	Mean VIF
Linear Model 1	1.12
Linear Model 2	1.33
Non-Linear Model 4	1.33
Dummy Variables Model 5	1.10

Test 5: Heteroskedasticity (Breusch-Pagan / Cook-Weisberg)

Model	P-Value
Linear Model 1	0.0001
Linear Model 2	0.0001
Non-Linear Model 4	0.7134
Dummy Variables Model 5	0.0001

Test 6: Two sample Wilcoxon rank-sum

Group 1: Control-Session 1; Group 4: Control-Session 2; Variable: Support to the current Government

Two-sample rank-sum (Mann-Whitney) test

Group	Obs.	Rank sum	Expected
1	60	3709.5	3330
2	50	2395.5	2775
Combined	110	6105	6105

Ho: Support to the current Government (group=1) = Support to the current Government (group=2)
z = 2.303 Prob > |z| = 0.0213

Test 7: Kolgomorov-Smirnov

Two-sample Kolmogorov-Smirnov test for equality of distribution functions

Smaller group	D	P-value	Exact
INFO:	0.0615	0.822	
SESSION2:	-0.3778	0.001	
Combined K-S:	0.3778	0.001	0.001

Test 8: Levene´s variance ratio test

Group 1: Control-Session 2; Group 2: INFO Treatment; Variable: Donation's variance

Variance ratio test

Group	Obs.	Mean	Std. Error	Std. Dev	(95% Conf. Interval)	
1	50	3.14	0.8398	5.9384	1.452299	4.827701
2	54	4.7	0.6347	4.6647	3.43048	5.976927
Combined	104	3.95	0.5243	5.3469	2.912074	4.991772

ratio = sd (1) / sd (2) f = 1.6207
Ho: ratio = 1 degrees of freedom = 49,53

Ha: ratio < 1 Ha: ratio = 1 Ha: ratio > 1
Pr (F < f) = 0.9568 2*Pr (F > f) = 0.0863 Pr (F > f) = 0.0432

Test 9: Two sample Wilcoxon rank-sum

Group 1: INFO Treatment; Group 2: Control-Session 1; Variable: Donation

Two-sample rank-sum (Mann-Whitney) test

Group	Obs.	Rank sum	Expected
1	54	3190	3105
2	60	3365	3450
Combined	114	6555	6555

Ho: donation (group=1) = donation (group=2) z = 0.496 Prob > |z| = 0.6202

Test 10: Levene´s variance ratio test

Group 1: Control-Session 2; Group 2: INFO Treatment; Variable: Belief average donation others

Variance ratio test

Group	Obs.	Mean	Std. Error	Std. Dev	(95% Conf. Interval)	
INFO	54	11.17	1.23	9.00	8.72	13.63
Session 2	50	6.49	1.01	7.13	4.46	8.51
Combined	104	8.92	0.83	8.45	7.28	10.56

ratio = sd (1) / sd (2) f = 1.5948

Ho: ratio = 1 degrees of freedom = 53, 49

Ha: ratio < 1 Ha: ratio = 1 Ha: ratio > 1

Pr (F < f) = 0.9496 2*Pr (F > f) = 0.1008 Pr (F > f) = 0.0504

Test 11: Median test

Greater than the median	Group INFO	Group Session 2	Total
No	25	33	58
Yes	29	17	46
Total	54	50	104

Pearson chi2(1) = 15.491 Pr = 0.000

Fisher's exact = 0.05

1-side Fisher's exact = 0.034

Continuity corrected:

Pearson chi2(1) = 3.3263 Pr = 0.068

Test 12: Variance Inflation Factors (Collinearity measures)

Model	Mean VIF
Non-Linear Model 1	1.18
Non-Linear Model 2	1.06
Non-Linear Model 3	1.08
Non-Linear Model 4	1.20
Non-Linear Model 5	1.08
Non-Linear Model 6	1.04
Non-Linear Model 7	1.64
Linear Model 8	2.52

Test 13: Two sample Wilcoxon rank-sum

Group 1: NGO Treatment; Group 2: Control-Session 1, 2 and INFO Treatment; Variable: Donation

Group	Obs.	Rank sum	Expected
1	60	6486.5	6750
2	164	18713.5	18450
Combined	224	25200	25200

Ho: donation (group=1) = donation (group=2) z = -0.628 Prob > |z| = 0.5298

Test 14: Two sample Wilcoxon rank-sum

Group 1: NGO Treatment; Group 2: Control-Session 1, 2 and INFO Treatment; Variable: Belief average donation others

Group	Obs.	Rank sum	Expected
1	60	6134.5	6750
2	164	19065.5	18450
Combined	224	25200	25200

Ho: Belief average donation others (group=1) = Belief average donation others (group=2) z = -1.435 Prob > |z| = 0.1513

Test 15: Median Test

Variable: Donation

Greater than the median	Group		Total
	Control Session 3	Informed Policies	
no	25	15	40
yes	14	25	39
Total	39	40	79

Pearson chi2(1) = 5.5908 Pr = 0.018

Continuity corrected:

Pearson chi2(1) = 4.5772 Pr = 0.032

Test 16: Median Test

Variable: Donation

Greater than the median	Group		Total
	Control Session 3	Public Figure	
no	28	16	44
yes	11	22	33
Total	39	48	77

Pearson chi2(1) = 6.9276 Pr = 0.008

Continuity corrected:

Pearson chi2(1) = 5.7683 Pr = 0.016

Test 17: Two sample Wilcoxon rank-sum

Group 1: Control-Session 3; Group 2: Informed Policies Treatment; Variable: Donation

Group	Obs.	Rank sum	Expected
1	39	1349	1560
2	40	1811	1600
Combined	79	3160	3160

Ho: donation (group=1) = donation (group=2) z = -2.164 Prob > |z| = 0.0304

Test 18: Two sample Wilcoxon rank-sum
Group 1: Control-Session 3; Group 2: Public Figure Treatment; Variable: Donation

Group	Obs.	Rank sum	Expected
1	39	1229	1521
2	38	1774	1482
Combined	77	3003	3003

Ho: donation (group=1) = donation (group=2) z = -3.066 Prob > |z| = 0.0022

Test 19: Two sample Wilcoxon rank-sum (Gender)
Group 1: Control-Session 3; Group 2: Informed Policies Treatment; Variable: Gender

Group	Obs.	Rank sum	Expected
1	39	1530.5	1560
2	40	1629.5	1600
Combined	79	3160	3160

Ho: Gender (group=1) = Gender (group=2) z = -0.334 Prob > |z| = 0.7384

Test 20: Two sample Wilcoxon rank-sum (Gender)
Group 1: Control-Session 3; Group 2: Public Figure Treatment; Variable: Gender

Group	Obs.	Rank sum	Expected
1	39	1472.5	1521
2	38	1530.5	1482
Combined	77	3003	3003

Ho: Gender (group=1) = Gender (group=2) z = -0.571 Prob > |z| = 0.5680

Test 21: Two sample Wilcoxon rank-sum (Gender)
Group 1: Informed Policies Treatment; Group 2: Public Figure Treatment; Variable: Gender

Group	Obs.	Rank sum	Expected
1	40	1559	1580
2	38	1522	1501
Combined	78	3081	3081

Ho: Gender (group=1) = Gender (group=2) z = -0.243 Prob > |z| = 0.8079

Test 22: Two sample Wilcoxon rank-sum (Political Ideology)
Group 1: Control-Session 3; Group 2: Informed Policies Treatment; Variable: Political Ideology

Group	Obs.	Rank sum	Expected
1	39	1574	1560
2	40	1586	1600
Combined	79	3160	3160

Ho: Political Ideology (group=1) = Political Ideology (group=2) z = 0.146 Prob > |z| = 0.8837

Test 23: Two sample Wilcoxon rank-sum (Political Ideology)
Group 1: Control-Session 3; Group 2: Public Figure Treatment; Variable: Political Ideology

Group	Obs.	Rank sum	Expected
1	39	1477	1521
2	38	1526	1482
Combined	77	3003	3003

Ho: Political Ideology (group=1) = Political Ideology (group=2) z = -0.472 Prob > |z| = 0.6372

Test 24: Two sample Wilcoxon rank-sum (Political Ideology)
Group 1: Informed Policies Treatment; Group 2: PF Treatment; Variable: Political Ideology

Group	Obs.	Rank sum	Expected
1	40	1535	1580
2	38	1546	1501
Combined	78	3081	3081

Ho: Political Ideology (group=1) = Political Ideology (group=2) z = -0.472 Prob > |z| = 0.6370

Test 25: Two sample Wilcoxon rank-sum (Socio-economic Status)
Group 1: Control-Session 3; Group 2: Informed Policies Treatment; Variable: Socio-economic status

Group	Obs.	Rank sum	Expected
1	39	1613	1560
2	40	1547	1600
Combined	79	3160	3160

Ho: socio-economic status (group=1) = socio-economic status (group=2) z = 0.552 Prob > |z| = 0.5811

Test 26: Two sample Wilcoxon rank-sum (Socio-economic Status)
Group 1: Control-Session 3; Group 2: Public Figure Treatment; Variable: Socio-economic status

Group	Obs.	Rank sum	Expected
1	39	1657.5	1521
2	38	1345.5	1482
Combined	77	3003	3003

Ho: socio-economic status (group=1) = socio-economic status (group=2) z = 1.480 Prob > |z| = 0.1388

Test 27: Two sample Wilcoxon rank-sum (Socio-economic Status)
Group 1: Informed Policies Treatment; Group 2: PF Treatment; Variable: Socio-economic status

Group	Obs.	Rank sum	Expected
1	40	1665	1580
2	38	1416	1501
Combined	78	3081	3081

Ho: socio-economic status (group=1) = socio-economic status (group=2) z = 0.901 Prob > |z| = 0.3677

Test 28: Two sample Wilcoxon rank-sum (Religiosity)
Group 1: Control-Session 3; Group 2: Informed Policies Treatment; Variable: Religiosity

Group	Obs.	Rank sum	Expected
1	39	1569.5	1560
2	40	1590.5	1600
Combined	79	3160	3160

Ho: religiosity (group=1) = religiosity (group=2) z = 0.094 Prob > |z| = 0.9250

Test 29: Two sample Wilcoxon rank-sum (Religiosity)
Group 1: Control-Session 3; Group 2: Public Figure Treatment; Variable: Religiosity

Group	Obs.	Rank sum	Expected
1	39	1423	1501.5
2	37	1503	1424.5
Combined	76	2926	2926

Ho: religiosity (group=1) = religiosity (group=2) z = -0.824 Prob > |z| = 0.4097

Test 30: Two sample Wilcoxon rank-sum (Religiosity)
Group 1: Informed Policies Treatment; Group 2: Public Figure Treatment; Variable: Religiosity

Group	Obs.	Rank sum	Expected
1	40	1474	1560
2	37	1529	1443
Combined	77	3003	3003

Ho: religiosity (group=1) = religiosity (group=2) z = -0.885 Prob > |z| = 0.3761

Test 31: Wilcoxon matched-pairs signed-ranks test for Control-Session 3

Sign	Obs.	Sum ranks	expected
Positive	18	549	274.5
Negative	0	0	274.5
Zero	21	231	231
All	39	780	780

Ho: donation = 0 z = 4.184 Prob > |z| = 0.0001

Test 32: Wilcoxon matched-pairs signed-ranks test for Informed Policies Treatment

Sign	Obs.	Sum ranks	expected
Positive	27	729	364.5
Negative	0	0	364.5
Zero	13	91	91
All	40	820	820

Ho: donation = 0 z = 5.003 Prob > |z| = 0.0001

Test 33: Wilcoxon matched-pairs signed-ranks test for Public Figure Treatment

Sign	Obs.	Sum ranks	expected
Positive	30	705	352.5
Negative	0	0	352.5
Zero	8	36	36
All	38	741	741

Ho: donation = 0 z = 5.147 Prob > |z| = 0.0001

Source	SS	df	MS		Number of obs	= 197
					F (5, 191)	= 6.41
Model	769.458278	5	153.891656		Prob > F	= 0.0000
Residual	4586.04934	191	24.0107295		R-squared	= 0.1437
					Adj R-squared	= 0.1213
Total	5355.50761	196	27.3240184		Root MSE	= 4.9001
Donation	Coef.	Std. Err.	T	P>|t|	[95% Conf. Interval]	
Corruption	0.0021333	0.0073063	0.29	0.771	-0.01227	0.01654
Support to current president	0.4516313	0.1238356	3.65	0.0001	0.20737	0.69589
Belief average donation others	0.1936355	0.0469139	4.13	0.0001	0.10109	0.28617
Beliefs in a just world	0.0576321	0.1367121	0.42	0.674	-0.21207	0.32791
Preferences for equality	-0.224222	0.1230024	-1.82	0.07	-0.46683	0.01839
Intercept	2.257599	1.809833	1.25	0.214	-1.31223	5.82742

Table A: Results of model 1 (table 7)

Dependent variable	Donation (D) > 0		Log (D)
Independent variable	**(1)**	**(2)**	**(3)**
1. Corruption (1: least - 180: most)		0.0080	-0.0009
		(0.0118)	(0.0013)
2. Waste Index	-0.0025		
	(0.0278)		
3. Support to current president (0: not at all, 10: entirely)	0.4445*	0.3642	0.0586***
	(0.2264)	(0.2356)	(0.0222)
4. Belief average donation others	0.2101***	0.2185**	0.0339***
	(0.0768)	(0.0831)	(0.0083)
5. Beliefs in a just world (0: only luck, 10: only personal effort)	0.3139	0.2684	0.0153
	(0.2103)	(0.2884)	(0.0234)
6. Preferences for equality (0: none, 10: maximum equality)	-0.2209	-0.3026	-0.0396*
	(0.2165)	(0.3487)	(0.0217)
7. Gender (0: Male, 1: Female)		-2.0591*	-0.0846
		(1.2287)	(0.1144)
8. Political preferences (0: extreme left, 10: extreme right)		-0.5132	0.0120
		(0.4635)	(0.0371)
9. Education		-0.4721	-0.0804
		(0.9495)	(0.0776)
10. Socio-economic level		0.9561	0.1061
		(0.6959)	(0.0709)
11. Treatment (1: participated in IP or PF; 0: otherwise)		1.4673	
		(1.6500)	
Intercept	0.9358	4.0226	1.3133
	(2.7515)	(6.8129)	(0.5287)
Obs.	75	75	181
Adjusted R-square	0.1215	0.0908	0.1370

Note: Robust standard errors in parentheses. Models 1, 2 and 3 are estimated by OLS. Models 1 and 2 do not satisfy the homocedasticity assumption (Breusch-Pagan test, p-value = 0.001), while model 3 does accomplish it, all models apparently satisfy non-multicollinearity, as signaled by a VIF of less than 1.27 for any coefficient in all regressions. ***, **, and * indicate significance at 1%, 5 %, and 10% levels, respectively. In model 2, a SOCIAL dummy is defined based on the response of the subject on the% of spending on social expenditure. Specifically, the subjects are divided into two halves according to whether they respond above the median of the distribution or not; the dummy takes value 1 for all subjects in the upper half. Put in model 2 that dummy interacted on one side with variable 5 and on the other hand with variable 6. Model 3 is a regression for all years

Table B: Alternative models

Source	SS	df	MS		Number of obs	= 247
					F (5, 191)	= 5.15
Model	8.49531758	12	153.891656		Prob > F	= 0.0000
Residual	32.197072	234	24.0107295		R-squared	= 0.2088
					Adj R-squared	= 0.1682
Total	40.69239	246	27.3240184		Root MSE	= 0.3709
Log (Donation + 1)	Coef.	Std. Err.	T	P>|t|	[95% Conf. Interval]	
Corruption	-0.00051	0.0005138	-1	0.319	-0.0015251	0.0004993
Support to current president	0.02362	0.0088503	2.67	0.008	0.0061934	0.0410664
Beliefs average donation others	0.02002	0.00339	5.97	0	0.0135662	0.0269238
Beliefs in a just world	0.01147	0.0089613	1.28	0.202	-0.0061779	0.0291325
Preferences for equality	-0.00799	0.0085863	-0.93	0.353	-0.0249125	0.0089201
Gender	-0.0174988	0.0438782	-0.4	0.69	-0.1039456	0.068948
Political preferences	0.0224449	0.0139028	1.61	0.108	-0.0049458	0.0498356
Education	0.0184231	0.0296943	0.62	0.536	-0.0400793	0.0769255
Socio-economic level	0.0028161	0.0284303	0.1	0.921	-0.0531959	0.0588281
Age	0.0018616	0.0028024	0.66	0.507	-0.0036595	0.0073826
weekly frequency of watching news	-0.0356461	0.0306513	-1.16	0.246	-0.0960338	0.0247417
number of cars owned	-0.0333938	0.034054	-0.98	0.328	-0.1004855	0.0336978
Intercept	0.1404729	0.2175352	0.65	0.519	-0.2881048	0.5690506

Table C: Results of model 3 (table 7)

Source	SS	df	MS		Number of obs	= 181
					F (5, 191)	= 3.48
Model	2.9496765	12	0.245806		Prob > F	= 0.0001
Residual	11.8599913	168	0.700595		R-squared	= 0.1992
					Adj R-squared	= 0.1420
Total	14.8096678	180	0.082275		Root MSE	= 0.2657
Donation	Coef.	Std. Err.	T	P>|t|	[95% Conf. Interval]	
Corruption	-0.00019	0.00043	-1	0.658	-0.001048	0.00066
Support to current president	0.02013	0.00746	2.70	0.008	0.005385	0.03487
Beliefs average donation others	0.01167	0.00280	4.17	0.0001	0.006144	0.01720
Beliefs in a just world	0.00417	0.007872	0.53	0.597	-0.01137	0.01971
Preferences for equality	-0.01289	0.00730	-1.77	0.079	-0.0273	0.00152
Gender	-0.02318	0.03848	-0.60	0.548	-0.099158	0.05278
Political preferences	0.004537	0.01249	0.36	0.717	-0.020124	0.02920
Education	-0.028387	0.02610	-1.09	0.278	-0.0799	0.02314
Socio-economic level	0.038909	0.0238	1.63	0.105	-0.0082	0.086020
Age	0.00056	0.00234	0.24	0.811	-0.00405	0.00518
weekly frequency of watching news	-0.04422	0.0269	-1.64	0.103	-0.0974	0.0090
number of cars owned	0.012511	0.0320	0.39	0.696	-0.05068	0.0757
Intercept	0.672389	0.17786	3.78	0.0001	0.32125	1.02351

Table D: Results of model 2 (table 7)

Source	SS	df	MS		Number of obs	75
					F(5, 191)	= 1.00
Model	6.1218	8	0.76522		Prob > F	= 0.4477
Residual	50.7199	66	0.76848		R-squared	= 0.1077
					Adj R-squared	= -0.0005
Total	56.8417	74	0.76813		Root MSE	= 0.87663
Donation	Coef.	Std. Err.	T	P>|t|	[95% Conf. Interval]	
Corruption	0.0009	0.00196	0.46	0.648	-0.00302	0.00482
Support to current president	0.0587	0.03766	1.56	0.123	-0.01641	0.13401
Belief average donation others	0.0231	0.01388	1.66	0.101	-0.00464	0.05079
Beliefs in a just world	0.04222	0.03758	1.12	0.265	-0.03281	0.11727
Beliefs of Tax-to-GDP ratio	0.0008	0.00425	0.19	0.851	-0.00768	0.00928
% going to social programs	-0.0265	0.22588	-0.12	0.907	-0.47746	0.42454
% going to infrastructures	0.0668	0.22214	0.30	0.765	-0.37672	0.51034
% going to salaries	0.0039	0.00689	0.57	0.571	-0.00985	0.01771
Intercep	0.3959	0.51511	0.77	0.445	-0.63253	1.42435

Table E: Results of alternative model 1 (table 7) for 2018 sessions

Logistic regression					Number of obs	= 117
					LR chi2 (5)	= 25.13
Log likelihood	-63.814505				Prob > chi2	= 0.0028
					Pseudo R2	= 0.1645
Donation (positive donation takes value 0 and donation zero takes value 1)	Coef.	Std. Err.	T	P>|t|	[95% Conf. Interval]	
Corruption	0.00071	0.00389	0.18	0.854	-0.00691	0.00835
Support to current president	-0.04851	0.07911	-0.61	0.540	-0.20356	0.10655
Belief average donation others	-0.06574	0.03214	-2.05	0.041	-0.12876	-0.00273
Beliefs in a just world	-0.14358	0.08289	-1.73	0.083	-0.30605	0.01887
Preferences for equality	0.22167	0.08152	2.72	0.007	0.06188	0.38145
Beliefs of Tax-to-GDP ratio (differences)	0.01958	0.00881	2.23	0.026	0.00233	0.03684
% going to social programs (differences)	0.01098	0.02576	0.43	0.670	-0.03951	0.06148
% going to infrastructures (differences)	0.03051	0.02197	1.39	0.165	-0.01255	0.07358
% going to salaries (differences)	-0.03202	0.02507	-1.28	0.202	-0.08117	0.01712
Intercept	-1.10704	1.06991	-1.03	0.301	-3.20403	0.98995

Table F: Results of alternative model 4 (table 7) for 2018 sessions

Dependent variable	Donation (D) > 0		Log (D + 1)	Dummy (D = 0 or D > 0
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**
1. Corruption (1: least - 180: most)	0.010525	0.01015	0.00067	-0.00192
	(0.1035)	(0.0117)	(0.000673)	(0.0041)
2. Support to current president (0: not at all, 10: entirely)	0.46527**	0.40625*	0.01651	-0.04913
	(0.2165)	(0.2339)	(0.01355)	(0.0791)
3. Belief average donation others	0.20578***	0.19874**	0.01576***	-0.07420**
	(0.0735)	(0.0787)	(0.0049)	(0.0337)
4. Beliefs in a just world (0: only luck, 10: only personal effort)	0.34746	0.28987	0.0297**	-0.16174**
	(0.2107)	(0.2292)	(0.01367)	(0.1617)
5. Preferences for equality (0: none, 10: maximum equality)	-0.22911	-0.26016	-0.03698***	0.24896***
	(0.2101)	(0.2262)	(0.01314)	(0.4904)
6. Gender (0: Male, 1: Female)		-1.71856	-0.05206	
		(1.2559)	(0.0759)	
7. Political preferences (0: extreme left, 10: extreme right)		-0.49785	0.01843	
		(0.4499)	(0.02458)	
8. Education		-0.44228	0.00463	
		(0.9400)	(0.0544)	
9. Socio-economic level		0.87545	0.00864	
		(0.6864)	(0.043)	
10. Treatment (1: participated in IP or PF; 0: otherwise)		1.40898	0.2814***	-1.5453***
		(1.6138)	(0.0809)	-0.4904
Intercept	-0.8274	2.9643	-0.2137	0.9921
	(2.7398)	(7.2526)	(0.4188)	(1.1335)
Obs.	75	75	117	117
Adjusted R-square	0.1344	0.1189	0.1945	0.1759

Note: Robust standard errors in parentheses. Models 1, 2 and 3 are estimated by OLS. Models 1 and 2 do not satisfy the homocedasticity assumption (Breusch-Pagan test, p-value = 0.004), while model 3 does accomplish it, all models apparently satisfy non-multicollinearity, as signaled by a VIF of less than 1.32 for any coefficient in all regressions. ***, **, and * indicate significance at 1%, 5 %, and 10% levels, respectively.

Table G: Regression analysis of treatment effects in the 2018 sessions